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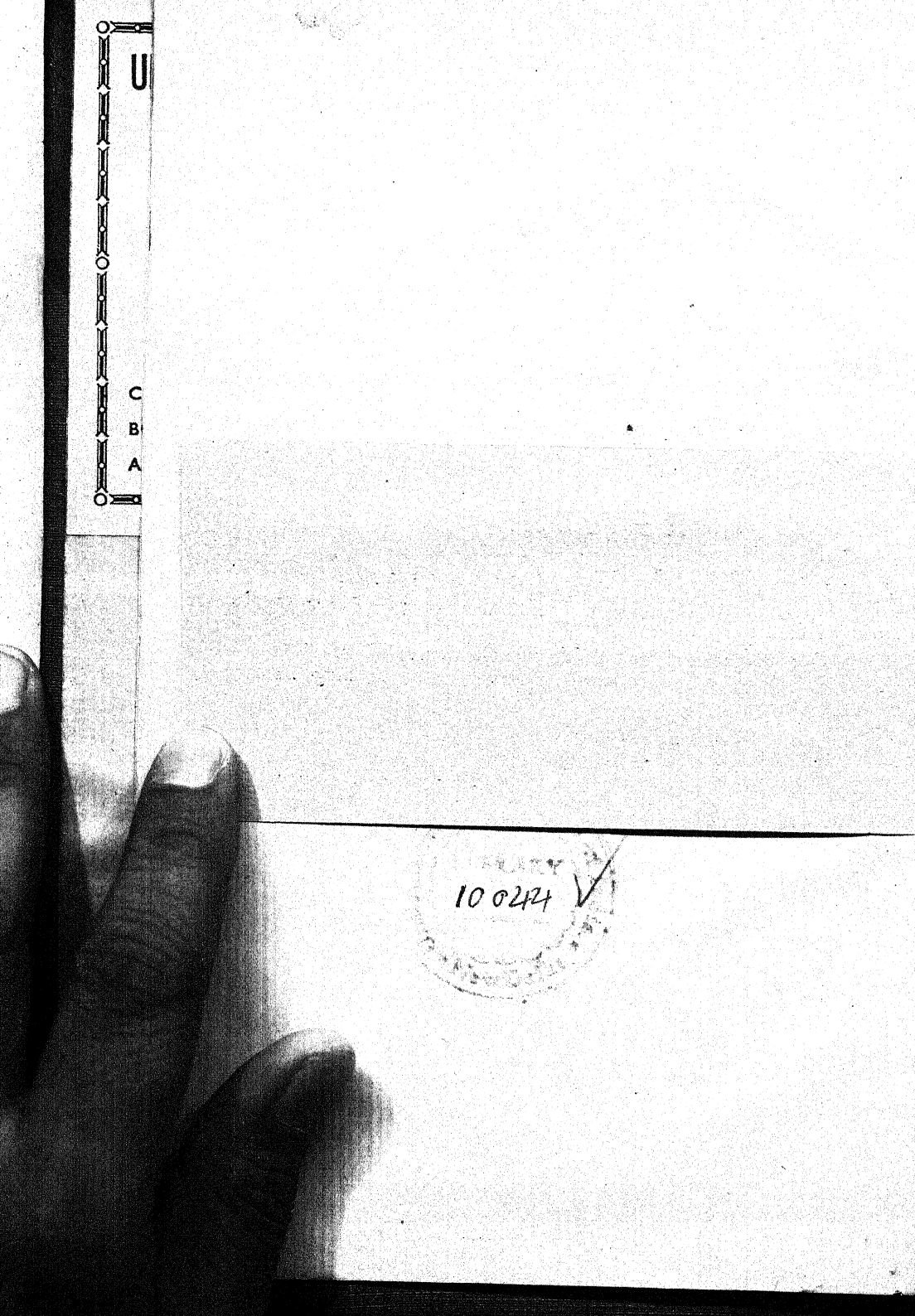
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The Journal
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THE ORGANIZATION AND OFFICERING OF THE NATIVE ARMY.

BY CAPTAIN G. H. ROBINSON, 1ST BATT., 1ST GURKHA L. I.

THE efficient officering of the native army is such a vital question to the welfare of the Indian empire at the present time that it behoves every man with an idea on the subject to bring it forward in the faint hope of its being one more peg in the coffin of the present system—a system which has shewn itself unable to withstand the strain of the prolonged campaigns in Afghanistan and Burmah, and which will most certainly lead to disaster if brought into contact with an European enemy. It has been a disappointment to the majority of regimental officers that perhaps the most important question in the re-organization of the native army—namely the officering of the native regiments—has been left untouched in the Army Circular of the 13th October last. Most officers admit that there are too few British officers in our native corps, and those there are, are not distributed to the best advantage. In support of the first of these two statements I would quote the military axiom that the less good the material of which your regiments are composed the more numerous and efficient must be your officers. If, therefore, British infantry—pronounced the best in the world by such an authority as Marshal Ney—require 25 to 30 officers per battalion on a war footing, how much more do our native battalions require this number of efficient leaders, and yet they only have eight British and sixteen native officers, the latter generally well on in years, having lost the energy and fire of youth, and wanting in education and intelligence. On a campaign matters become very serious—one British officer is usually left behind at the depôt, another is told off to act as a transport officer, a third and a fourth are frequently sent away in charge of detachments, often of only 50 to 100 men, *i.e.*, native officers' commands, a fifth gets sick and has to be left behind in a field or base hospital. Thus with the head-quarters there are frequently only to be found the Commanding Officer, the Adjutant, and one or two others. Any one who has campaigned with a native regiment, under the present system, will readily admit that the above is not an overdrawn picture. What would

happen if this battalion was now called upon to take part in a general action against troops trained as modern infantry are trained? Who would lead the "fighting line" and direct its fire? There is not, on an average, one native officer per battalion who is capable of doing this efficiently. The Commanding Officer and the Adjutant would have enough to do looking after the battalion generally. One of the other officers would be in command of the main body, and, if one remained, he would possibly be in charge of the baggage. There would be no one to direct the fire of the "fighting line," and it would be quickly brought to a halt by the unequal combat in which it would find itself engaged, for its fire would probably be quite innocuous for want of proper direction. The remedy for this is, of course, more properly trained officers. Native officers, as a rule, have neither the education nor the intelligence to enable them to be trained to the requisite efficiency. Hence more British officers are absolutely necessary.

Next, as to the distribution of work. In the cavalry, the regiments are divided into four squadrons, each commanded by a "squadron commander," and, besides the commandant and adjutant, there are two* "squadron officers." Of the last named, one is usually a sort of a quarter-master without the name. The other is available for odd jobs. Here the work is fairly well distributed among the British officers. In the infantry, however, things are very different. The organization of a battalion is practically in two huge companies, called wings, of 400 and odd men, each commanded by a "wing commander," assisted by one or two "wing officers," if these latter are available. Besides these there are the commandant, adjutant and quarter-master, who form the staff of the battalion. The responsibilities of command fall somewhat heavily, then, on the wing commanders, for they have to superintend and are responsible for the target practice, field training, and other exercises of their half battalions. They have to keep the records and accounts of their men, are responsible for their payment and supply of necessaries. They have to know all about the qualifications of each individual in their respective commands, so that they may be in a position to advise the commandant as to his fitness for promotion, invaliding, and a host of minor matters. Finally, they have frequently to be in two places at once,—in other words they must neglect one part of their work in order to be able to superintend another; for instance, while a wing commander is away with one double company at field training, the other two companies are left to the tender mercies of their native officers, or, perhaps, of a young probationer. It is laid down, certainly, that the native officers should not be disturbed in the command of their companies, but the wing commander is, nevertheless, held responsible that all goes well.

I have already endeavoured to show that more British officers are absolutely necessary. In the cavalry the increase would naturally take the form of more "squadron officers," so as to give one at least to each squadron, in addition to the adjutant and quarter-master. In the infantry, the increase might take place in two ways: First, by replacing

* Three.

the three wing officers by eight company commanders, who would take sole charge of the eight companies, the wing commanders merely exercising a general supervision, much in the same way as the Majors of a British battalion under the old organization. This scheme would necessitate 13 British officers with each battalion of native infantry, namely, 1 commandant, 2 wing commanders, 1 adjutant, 1 quarter-master and 8 company commanders. The advantages claimed for this proposal are: (1), that every officer would have definite duties in which to interest himself, and the work of the battalion would be well distributed; (2), it would not necessitate a change in the present organization of a battalion of eight companies. Its disadvantages are: (1), very young officers, quite new to native troops, would frequently be in command of companies; (2), sometimes companies might have to be commanded by field officers, unless all superfluous field officers were either pensioned or sent to general duty; (3), in the event of a company commander being absent on leave, on duty, there would only be native officers to take his place; and (4), the inadvisability of superseding native officers in the command of companies of the present strength and organization. These objections are, I think, sufficient to veto this proposal. My second proposal is to split up the present cumbersome wing organization into four large companies, as in the Continental armies, each commanded by a "company commander" who would be assisted by a "company officer," the commandant, adjutant, and quarter-master forming the battalion staff as at present. This scheme would necessitate 11 British officers per battalion, namely, 1 commandant, 4 company commanders, and 6 company officers, including the adjutant and quarter-master, and it would correspond to the organization of the cavalry in four squadrons. The subadars, in this case, would command the half companies and flank sections; the jemadars the centre sections, into which each company would be divided. All native officers, except the subadar major, would perform subaltern's duties, which is what they practically do now. The advantages claimed for this organization are: (1) That seven of the eleven officers would have definite duties to perform, while the remaining four would usually be young officers in reserve learning their work and available to take the place of a senior in the event of the latter being absent or sick. (2) It would give suitable employment to the many majors and captains of the native army, who are at present performing subaltern's duties as wing officers. (3) It would avoid hurting the susceptibilities of the native officers by ensuring to them the same size of command as at present, and similar responsibilities as regards their sections, as they at present enjoy with respect to their companies. The objections to this scheme might appear to be: (1) Change in the present organization of eight companies by doubling them up into four. (2) The difficulty of battalions, so organized, working in brigade, or larger bodies, with battalions of British infantry still organized in eight small companies. (3) The difficulty with which one man would control so large a company as 200 to 250 men on parade or in the field. In reply to the first objection I would urge that, if a change of system is necessary, then the above will be the cheapest and most effective way

of doing it. With reference to the second, I would point out that there is nothing in the present field exercises for infantry which prevents a battalion working in four strong companies in preference to a greater number of smaller ones, and there are a very few of the antiquated manœuvres in Part III which cannot be carried out by a battalion of four companies. There are one or two which would require modification as far as native infantry are concerned; for instance, from line, "square on the two centre companies" would have to be modified to "square on the right (or left) centre company," when the named company would form the front face, the companies standing next to it on either flank would form the right and left faces, and the distant company the rear face, each company moving as at present. Again, in advancing from line in double column from the centre, the caution might be "two centre *half* companies to the front," instead of "two centre companies to the front." In answer to the third objection I would observe that in the armies of Germany, France, Russia, Austria and Italy the battalions are organized into four strong companies of 200 to 250 men each, and it is a slur on the British officers to think that he cannot command a company of this strength, when the officers of the above mentioned armies experience no difficulty in doing so. One more argument in favor of these strong companies: The more rifle fire tactics are developed the more do they tend to reduce the size of the infantry tactical unit, so much so that the battalion has already practically ceased to be the tactical unit of infantry, and is giving place to the company, but our companies, under the present organization, are not only too small to be efficient tactical units, but there are also too many of them in a battalion for the commanding officers to effectively supervise. If my memory serves me, I think it was Napoleon who laid down the rule that no Commander should have more than four units to look after. Hence everything appears to tend to the adoption of the continental system of large companies led by experienced and capable officers.

Under the organization here proposed a field battalion would consist of a staff and four companies. The staff would include—

Commandant	1	
Adjutant	1	
Quarter Master	1	
	—	3 British officers.
Subadar Major	1	
	—	1 Native officer.
Havildar Major	1	
Quarter Master Havildar ...	1	
Armourer Havildar	1	
Band Havildar	1	
Bugle-Majors	2	
Band Naick	1	
Band Sepoys	20	
Sepoy Bâtmen, Storemen, and Writers	10*	
	—	37 N. C. O.'s & men.

* Commandant's Bâtmen 2; Adjutant's Bâtman 1; Quarter Master's Bâtman 1 Subadar Major's Bâtman 1; Adjutant, Quarter Master and Mess Writers 3; Storemen 2

Total 3 British officers and 38 natives.

The 38 natives would, for the purposes of interior economy, form a staff section under the subadar major, who would be responsible to the adjutant.

Each of the four companies would consist of a "Company Staff" and four sections, as follows :—

Company Staff.		
Company Commander... ...	1	
Company Officer	1	
	—	2 British officers.
Drill Havildar	1	
Drill Naick	1	
Kôt Naick...	1	
Sepoy Bâtmen,* Writer, Mochi, Tailor, and Armourer ...	6	
	—	9 Natives.
Each Section.		
Subadar or Jemadar	1	
Havildars	2	
Naicks	2	
Bugler or Drummer	1	
Sepoys	50	
	—	56 Natives.

Thus each company would consist of 2 British and 4 native officers, 19 N.C. officers, 4 buglers or drummers, and 206 sepoys. Total 2 British officers and 233 natives. And a battalion of 11 British and 17 native officers, 83 N. C. officers, 16 buglers or drummers; and 854 sepoys. Total 11 British officers and 970 natives.

The lowest administrative unit should be the section ; anything smaller than that would not be practicable. For parade and tactical purposes, however, the section should be told off into two or more groups of from 4 to 8 files each. These groups would be commanded by N. C. officers, and would facilitate the maintenance of fire discipline very much. In order to always have a certain number of trained men in the ranks ready to take the places of these group leaders, I would suggest that at least four men per section should be appointed lance naicks and carefully trained in their duties. Those lance naicks who did not promise to turn out good N. C. officers could easily be sent back to duty as sepoys, all promotions to naick being made from the lance naicks. While on the subject of promotions I would suggest that up to the rank of havildar all promotions should go in the company on the recommendation of the company commander. This would ensure the company commanders working up their naicks and lance naicks, as they would not lose them by having them promoted out of their companies.

The advantage of keeping the battalion and company staffs distinct is that a company or section may be ordered off on detachment without disturbing the staff, or itself being broken into in order that these men may be left behind. It will be observed that the subadar

* One for each of the two British officers.

major is made extra to the company establishments. This native officer has many important duties to perform in a battalion, which are in addition to those of his company, and if his company is ordered on detachment he must delegate these duties to another less responsible subadar, or the company must proceed without him, which is decidedly inadvisable. The havildar major and quarter master havildar are both innovations. The former would take the place of the native adjutant at half the cost, and do the work equally well. The latter would do all the work at present performed by the tindal and a good deal more besides. The two sepoy storemen would be under him in charge of the magazine and half mounting stores respectively. Thus the tindal and his four lascars would be replaced by combatants, who would do the work as well, if not better, and five followers less would accompany a battalion on service.

The drill havildar and drill naick on the staff of each company may be considered superfluous, and so they would be if the present system of training recruits is maintained. Under the existing arrangement the recruit is trained by the adjutant and his staff in the way that officer thinks most advisable; he then joins his company, and his wing commander has another way of teaching his men, so that the first thing a recruit has to learn is to forget a great deal of what he learnt under the adjutant. It may be argued that if the wing commander and the adjutant both kept to the drill book this could not possibly happen. In reply I would urge that there are two or more ways of looking at the drill book instructions, the same as in most other matters. There is a great deal now-a-days left to the judgment of the officer, and very properly so, and officers will judge things in different lights the same as any one else. Under the proposed arrangement the recruit would come under the system of instruction of his company commander from the day he joined, and that officer would be solely responsible that he was properly taught from the beginning. In addition to training the recruits and young non-commissioned officers of his company, the drill havildar would have to keep the company rosters and other vernacular records, while the company writer would do all the work in English, which is at present performed by the pay havildar in the vernacular. The kôt naick would receive a small staff salary for looking after the company stores. It would, I think, be necessary to have a full non-commissioned officer in this position, bearing in mind the fact that the company would equal two of the present ones.

As regards the question of maintaining the numbers of a battalion in the field, the Army Circular of the 13th October, 1886, already alluded to, has linked the regiments of the native army in threes or pairs and arranged for the formation of reserves. This is intended to be ample for the purpose of keeping up the field battalions on a war footing so far as regards the men. A first or regimental reserve of officers would be formed of the officers attached in lieu of those on furlough or leave exceeding six months, and of the four "company officers" of the battalion remaining behind in garrison. A second or general reserve of officers might be formed of officers in civil or

political employ who have not been absent from military duty for say five years, and also of police and volunteer officers who cared to accept commissions in such a reserve.

The great objection to this scheme for the organization and officering of the native army will be, as usual, the one of expense. Let us consider what this extra expense would be. It would practically be the pay and allowances of three young lieutenants per battalion, *i.e.*, about £1,000 per battalion per annum, or £129,000 per annum for the 129 battalions of which the native armies at present consist. If the revenues of the empire could not afford this paltry sum, for the sake of making the difference between inefficiency and efficiency, then it might be possible to curtail some of the expenditure on the administration and departments of the army itself, always bearing in mind that the administration and departments exist for the army and not the army for the administration and departments.

But there is no necessity for the whole of the 129 battalions of native infantry which at present exist, or for the five proposed battalions (1 Gurkha and 4 Sikh), to be organized on the above elaborate system or to be trained to the pitch of efficiency required for the purpose of meeting a European foe. For instance, there is no necessity for a battalion required to perform the duties of a border military Police in Assam, or for the purpose of maintaining order in such out-of-the-way places as Bhuj and Rajkot, to be organized and trained with the object of fighting the troops of our great rival in Asia. To so organize and train them is to institute a Nasmyth hammer for the purpose of cracking walnuts, and thereby incurring an unnecessary expense.

In order to effect a saving, therefore, I am going to take a leaf out of the valuable lecture given by Major Young in the United Service Institution at Simla last year, and divide the native infantry into regular and irregular battalions and "special corps." In order to arrive at an idea as to the numbers to be included in each of these three classes, it must first be considered what force it will probably be necessary to place on the Indus under certain circumstances. Experts have stated, I am given to understand, that an army of not less than 120,000 men is necessary, of which half should be Europeans. Now, such an army could be conveniently and economically organized into eight divisions of 15,000 each, as shewn in the Appendix. A reference to this Appendix will shew that six regular native battalions are required for each division, *i.e.*, 48 for the whole army. But in order that these 48 battalions be maintained in an efficient state during a protracted campaign, every pair of them will require a third battalion in reserve in India, *i.e.*, 24 additional battalions in reserve. Provision must be made, however, for active movable columns in India and other contingencies, for which another 18 battalions might be allotted, thus bringing the total up to 90 regular battalions. These would be permanently linked together into 30 regiments of three battalions each. It would be advisable, as a general rule, to canton the regular battalions at stations having British infantry quartered there; in fact, in order to get the

full benefit of organization, one or two British battalions might be permanently associated with each native regiment of three battalions, thus forming thirty permanent brigades of infantry. These thirty brigades, again, might be formed into ten divisions, Cavalry, Artillery and Sappers, being added in the requisite proportions.

The proposed "special corps" would consist of the Guides, six Pioneer and three Marine battalions. The Guides, I suggest, should be placed under the immediate orders of the Quarter-Master-General in India and be employed exclusively in the duties of intelligence, the officers being ex-officio attachés of the Intelligence Branch of the Quarter-Master-General's Department. The Pioneers to consist of two regiments of three battalions each, namely, one of Muzbi Sikhs for the Punjab and one of Madrassies. One of the proposed new Sikh battalions might conveniently be Muzbi Pioneers, thus completing the Punjab Pioneer Regiment. Another of the Madras battalions might be converted into Pioneers and thus form the Madras Pioneer Regiment of three battalions. The Bombay Marine Battalions already exists, I suggest the formation of a Madras and a Bengal Marine Battalion from existing corps. These three Marine battalions to be trained in submarine mining, and in manning second class torpedo boats for the defence of the coast line and the mouths of the many rivers. The Bombay battalion would have its head-quarters at Bombay, and furnish detachments to Kurachi, Aden and other places of minor importance on the coast line of the Bombay Presidency. The Madras battalion would have its head-quarters at Madras, and would furnish detachments along the east and west coasts of that Presidency. The Bengal battalion would have its head-quarters at Calcutta, and would furnish detachments to Rangoon, Port Blair and other places along the Bengal and Burmah coasts. The establishment of the "special corps" would be somewhat on the same lines as that of the regular battalions. The Pioneer battalions should have a proportion of skilled workmen of different crafts in each "section," so that it could be detached as an independent unit. The Marine battalions would require establishments according to the amount and nature of work required in each case. The Guides would consist, as at present, of cavalry and infantry, and might conveniently have two squadrons of the former and four companies of the latter organized, as here proposed, for regular battalions. They should include in their ranks Asiatics from every part of Asia, also Arabs and Egyptians.

The extra cost of these 100 battalions, so far as regards officers, would be roughly £100,000. The extra cost of the additional 130 sepoys, one native officer and one naick per battalion would come to about as much again. On the other hand there would be a saving effected in the cost of the irregular battalions, of which there would be 34, supposing the extra Gurkha and four Sikh battalions to be raised.

These 34 irregular battalions would give a grand opportunity for the higher employment of the few very capable native officers of the army as suggested by Major Young in the lecture before alluded to. The organization of these battalions would be somewhat on the same

lines as that of the regulars, but there should only be two British officers per battalion at the most, namely, the commandant, who should be a field officer, and the second-in-command and adjutant, who might be a captain. The "company commanders" would be native officers specially selected for capacity for command, and should have the rank of captain or lieutenant given them. In exceptional cases, and if fully qualified, they might be advanced even to the position of "commandant." "Company officers" would not, I think, be necessary for an irregular battalion. The following establishment is suggested :—

"Battalion Staff."

Commandant	1	
Second-in-Command and Adjutant	1	
	—	2 British officers.
Havildar Major	1	
Quarter Master Havildar ...	1	
Armourer Havildar	1	
Bugle-Major	1	
Writers, Bâtman and Storeman ...	6	
	—	10 N. C. O's & men.

"Company Staff."

Company Commander ...	1	Native officer.
Drill Havildar	1	
Drill Naick	1	
Kôt Naick	1	
Writer, Armourer, Tailor and Mochi (Sepoys)	4	
	—	7 N. C. O's & men.

"Section."

Subadar or Jemadar	1	
Havildars	2	
Naicks	2	
Bugler	1	
Sepoys	50	
	—	56 N. O., N. C. O's & men.

A company of three "sections" would thus consist of 1 company commander, 1 subadar, 2 jemadars, 7 havildars, 8 naicks, 3 buglers and 154 sepoys. Total 176 natives.

The establishment of an irregular battalion of four such companies would be, therefore, 1 commandant, 1 second-in-command and adjutant, 4 company commanders, 4 subadars, 8 jemadars, 31 havildars, 32 naicks, 1 bugle-major, 12 buglers and 622 sepoys. Total 2 British officers and 714 natives.

As all but two of the officers would be natives, the clerical work would have to be reduced to a minimum. I have purposely omitted the subadar major, as he would not be necessary to the commandant, the senior company commander at head-quarters being in a position to advise the commanding officer on points concerning the native ranks. The reasons given for the other staff N. C. officers under the head of the regular battalion, would apply equally to the irregular battalion. I have divided the company into three "sections" only for reasons of economy, and in order that the strength of an irregular battalion should not exceed about 700 men.

There are at present only twelve irregular battalions, properly so called,

namely, the six battalions of the Hyderabad Contingent and the six battalions in Rajputana and Central India. The saving effected in each of these would be about 2 officers and 200 men, or £25,000 per annum in all. The saving in the remaining 22 irregular battalions would be 6 officers and about 125 men each, or roughly about £75,000 per annum in all. Thus the total saving effected by the irregular system would be roughly £100,000 per annum as against the £200,000 per annum extra expenditure on account of the proposed regular system, so that there would be a nett extra expenditure of about £100,000, not very ruinous for an Empire.

There is nothing suggested in this paper to prevent the irregular battalions from taking part in Frontier campaigns against natives. For such purposes an irregular battalion would, in many respects, be more useful than a regular one. The only active service in which they would not be able to take part would be against an European enemy, and even in this case there would be nothing to prevent them from being employed on the lines of communication.

The following tables will show the organization of the native infantry as at present exists and as proposed in this paper :—

Present Organization.

Class.	Regiments of 3 Battalions	Regiments of 2 Battalions.	Regiments of 1 Battalion.	Total Battalions.	Remarks.
Gurkha ...	1	4	1*	12	* Second battalion to be raised.
Punjab ...	8	1†	1‡	27	† Pioneers.
Bengal ...	6	7	...	20	‡ Guides.
Bombay ...	8	...	2§	26	§ One Battalion Marines.
Madras ...	10	1†	...	32	
Hyderabad ...	...	...	6	6	
Rajputana ...	...	...	4	4	
Central India ...	...	...	2	2	
Total	33	7	16	129	

N.B.—One Gurkha and four Sikh battalions to be raised under the augmentation scheme.

Proposed Organization.

Class.	Line Regiments of three Battalions.	Pioneer Regiments of three Battalions.	Marine Battalions.	Irregular Battalions.	Guides.	Total Battalions.
Gurkha ...	4	...	...	1	...	13
Punjab ...	8	1	...	3	1	31
Bengal ...	5	...	1	4	...	20
Bombay ...	6	...	1	7	...	26
Madras ...	7	1	1	7	...	32
Hyderabad ...	...	...	...	6	...	6
Rajputana ...	...	...	...	4	...	4
Central India ...	...	...	...	2	...	2
Total ...	30	2	3	34	1	134

N.B.—If it is decided not to raise the proposed Gurkha and four Sikh battalions, the Gurkha and three Punjab irregular battalions, as also one of the Punjab Pioneer battalions, would have to be struck out of this table, reducing the total number of battalions by five.

It will be observed, on referring to the table of proposed organization, that proportionally a greater number of Gurkha and Punjab battalions are included in the regular line regiments. This is for the following reasons :—

1*st*.—They are mostly quartered nearer to the probable theatre of war than are those of Bengal, Bombay and Madras.

2*nd*.—By far the greater number of the British battalions, which would be brigaded with the regular native battalions, are quartered in Northern India, and this would facilitate the permanent organization into brigades and divisions.

3*rd*.—The Gurkhas, Sikhs and Punjabis are undoubtedly the best fighting material to be got in India, if not in Asia, and hence the advisibility of employing as many of these battalions in the front line as possible.

As regards the cavalry, no very great change in the organization would appear necessary. The regiments are already organized into four squadrons, each commanded by a British officer. All that is wanted then is to add three more squadron officers to each regiment, and to group the latter into brigades associated with the British cavalry regiments quartered in the country, of which there are nine.

There are in all 40 native cavalry regiments besides the Guides, namely, 19 Bengal, 4 Madras, 7 Bombay, 2 Central India, 4 Hyderabad Contingent and 4 Punjab Frontier. It would be convenient to group them into nine brigades of four regiments each, corresponding to the nine British cavalry regiments. This would absorb 36 regiments. The remaining four, which might conveniently be the Hyderabad Contingent regiments, would be irregular corps with only two British officers each. Each group of four could place three regiments into the field, which would be the complement of a field division, as shown in the Appendix. The remaining one would form the feeder in cantonments.

In conclusion, I would suggest that greater care be observed in selecting non-commissioned officers for the commissioned grades. Commanding officers are but human, and good worthy old havildars are frequently recommended for promotion to native officers who are in no wise capable of taking upon themselves the extra responsibilities. If Boards, under orders of General Officers commanding divisions and districts, were assembled for the practical and oral examination of havildars, recommended for promotion by commanding officers, somewhat in the same manner as examinations for native adjutants are now held, we should see far greater intelligence and ability in the commissioned grades than is now the case. From the native officers, so promoted, there would be no difficulty, I feel sure, in selecting thoroughly qualified squadron and company commanders for the irregular regiments and battalions.

DHARMSALA, 6*th January*, 1887.

APPENDIX.

The Suggested Organization of a Division.

Divisional Staff.

Cavalry Brigade.

Brigade Staff—
1 Battery, Royal Horse Artillery.
1 Regiment, British Cavalry.
3 Regiments, Native Cavalry.

Artillery Brigade.

Brigade Staff—
4 Batteries, Royal Field Artillery.
1 Battery, Royal Mountain Artillery.
1 Battery, Native Mountain Artillery.

Sappers and Miners.

1 Company, Native Sappers and Miners.

Three Infantry Brigades.

3 Brigade Staffs.
6 Battalions, British Infantry.
6 Battalions, Native Infantry.

On the cavalry brigade being detached, one native regiment would be left behind as divisional cavalry.

An army corps could be formed by assembling two divisions, in which case the two cavalry brigades, less the divisional cavalry regiments, would form the cavalry division, and two Field and one Mountain battery would be taken from each division to form the "corps artillery."

An extra company or two of Sappers and a battalion of Pioneers could be added if considered necessary.

THE SUPPLY OF AMMUNITION IN ACTION.

By Colonel W. Luckhardt, C.B.

The progressive improvement made in fire-arms has naturally increased the difficulties of the supply of adequate ammunition. So much was the correctness of this axiom recognized that, at the time the breech-loaders were invented, there was a general hesitation to introduce them, since it was feared that the rapidity of loading would result in the soldier soon finding himself without ammunition. The Prussians were the only nation who set aside these apprehensions; and to the surprise of every one, the Prussian-Austrian war showed results diametrically opposite to the general anticipations, for it was found that the expenditure of ammunition was less in the case of the breech-loader than in the muzzle-loader. Strange as this result may appear, it was only the natural development of the superiority of the needle gun, since two or three volleys sufficed to cause such terrible losses to the Austrians in the close formations to which they had adhered, that columns were swept away as soon as they appeared. However, already in the Franco-Prussian war of 1870-71, when such a decided inequality of weapons did not exist, and when breech-loader was opposed to breech-loader, instances occurred in which want of ammunition was seriously felt. But these were of a more or less isolated character, and it was left to the Russo-Turkish war of 1877-78 to show how intimately connected an adequate supply of ammunition is to the successful carrying out of operations. As the great attention and consideration since bestowed on this question by the European armies are chiefly due to the experience gained during this campaign, it may be of interest to go into details of the conditions which prevailed at the time. The Russian Infantry entered into this campaign with 60 cartridges per man, as pocket ammunition. A further supply was carried in 12 ammunition waggons in the case of regiments composed of 16 companies, and 9 ammunition waggons for those regiments which had only 15 companies. Each of these waggons carried 14,000 cartridges; and as only one waggon followed the battalion in the battle, a regiment with 16 companies had 23, and that with 15 had 18 cartridges actually available in the battle-field, in addition to what the men carried, representing a total of 83 and 78 cartridges respectively per man—a figure below that fixed as pocket ammunition in other armies at the time. For instance, in Italy 88 and in Germany 80 cartridges were carried by the men. Even in the first battles of the campaign, this insufficient supply of cartridges proved itself very detrimental. Throughout the fighting at Plevna, the constant complaint was made that troops had found themselves without ammunition. To remedy this defect, additional cartridges were issued, and the men were ordered to carry them in their

havresacks or in the pockets of their great coats, and in this manner the number of cartridges actually carried by the men rose finally to 200 rounds. The Guards entered the battle of Gorny Dubjack with from 90 to 105 cartridges per man ; yet, although this was a considerable increase on the number first carried, namely 60, ammunition ran out. The reckless firing of the Turks, even at distances far beyond the range of their rifles, exercised a detrimental influence upon the Russian soldier, who, in consequence, fell also into a similar reckless habit of firing carelessly and beyond the range of his rifle ; and this is clearly demonstrated by the total expenditure of ammunition, which amounted in the aggregate in 27 divisions to 47 cartridges per man, and ran as high as 67 cartridges per man in 14 of these divisions. In the Rifle regiments, this number was further exceeded, being 143 cartridges per man. The largest regimental expenditure took place in the following instances :—

94 cartridges per man in the battle of Kara Hassankiri by the 140th regiment ;

122 cartridges per man in the Shipka defile by the 13th Rifle regiment ;

121 cartridges per man at Seinova by the 11th Rifle regiment.

These numbers are extremely high when compared with the results of the war of 1866, in which the expenditure amounted to only 6 cartridges per man in the Bohemian army and 11 per man in the main army. At the battles of Nachod and Skaltiz, the expenditure was from 22 to 23 cartridges per man.

Consequent upon the experience gained in the Turkish war, a considerable addition in the quantity of the pocket ammunition of the Russian Infantry soldier was decided upon. The latter carries now 84 cartridges in the following manner :—

30 in each of his two ammunition pouches,
24 in a special compartment of his baggage bag,

making a total of 84 cartridges, which weigh 3·3 Kilogrammes, and with packing materials 3·61 Kilogrammes (1 Kilogramme is equal to about 2lbs. in English weight). Each of the two ammunition pouches is divided into five partitions, of which, each partition suffices to hold one packet of 6 cartridges. In order to be, however, in a position to make the soldier carry occasionally additional cartridges, two large side pockets have been provided for in the blouse, which has lately been substituted in place of the tunic formerly worn. Every company possesses, moreover, an ammunition waggon, which carries 60 additional cartridges per man. The Russian soldier, therefore, may be said to have at his command in battle, a total of 144 cartridges, which is much in excess of that of other armies. As a further reserve, 52 cartridges per man per Infantry and 54 per man per Rifle battalion are carried in the Divisional Park, and 10 more cartridges per man in the Movable Park. The total equipment amounts therefore to 206 and 208 cartridges respectively per man. For general comparison, we quote below the

total amount of ammunition at present carried in the field with the different European armies :—

England	160	rounds.
Italy	171	,,
Germany	171	,,
France	174	,,
Switzerland	200	,,
Russia	208	,,
Austria	234	,,

Of the above, the following number of rounds are carried by the men personally :—

England	70	rounds.
Italy	88	,,
Germany	80	,,
France	78	,,
Switzerland	100	,,
Russia	84	,,
Austria	70	,,

The manner in which the replenishment of ammunition is to be carried out is not yet decided upon. General Baron Saddler has recommended pack horses to be substituted for the waggons ; and he supports his recommendation by the fact that the Turks used the former with much success during the campaign. Hitherto the replenishment of ammunition in the skirmishing line was left to the men themselves, but this mode was found to have grave disadvantages, since it lessens the strength of the skirmishing line considerably, and, moreover, offers the men an excuse to quit their places at critical times. To enable this work, however, to be carried out by bringing up the ammunition waggon into the line of fire, is not considered feasible on account of the difficult nature of the ground which is now generally chosen for Infantry fighting.

The system of carrying reserve ammunition in special waggons prevails generally in the European armies at present ; but much diversity of opinion exists as to whether these waggons should be massed together and kept at the *queue* of the brigade, or whether each battalion should have independent charge of its reserve ammunition. In the German army, the former system prevails, but General Verdy du Vernois is averse to this, for he states in his "Studies on leading troops," as follows : "The Infantry ammunition waggons should now-a-days never be separated from their battalions. At present, in accordance with instructions, the waggons of a brigade are to be massed together and be made to follow the brigade ; and it is ruled that only when a battalion is detached, its waggon is to accompany it. But it appears decidedly preferable that each battalion should always have its ammunition waggon with it, as circumstances may often occur when it may have to be suddenly detached in the course of the battle, and its waggon be not found ready at hand to follow, and thus the battalion may find itself permanently separated from its ammunition." The same system of keeping ammunition waggons massed per brigade obtains in the Swiss army ; and Colonel Bluntschli in his "Zeitschrift fur Artillerie und Genie," May 1884, in dealing with this subject, expresses himself

much to the same effect, and he says : "It appears a more preferable system that each battalion should always have its ammunition waggon (first reserve) with it. Such a course will ensure the certainty of the supply being forthcoming when required, and it appears the more recommendable for the reason that, if these waggons are massed together, they offer a good object for a sudden attack by the enemy's Cavalry, and they are in this manner further more exposed to destruction by the enemy's artillery than would be the case if they were separately posted." As Colonel Bluntschli gives in the same article the establishment maintained for the first reserve, we take this opportunity of quoting these particulars.

	Per Battalion.	*Per Brigade.*
Non-Commissioned Officers ...	1	6
Armour-Sergeants	2	12
Watchmen	3	18
Lance-Corporals	1	6
Transport drivers	4	24
Additional per Regiment.		
Sergeants	1	2
Additional per Brigade.		
Transport Lieutenant ...		1
Guides		2
Total ..		71 men

(*viz.*, 1 officer, 8 non-commissioned officers and 62 men), with 12 half caissons (2 per battalion, each containing 12,000 rounds, total 35 rounds per man) and 6 Fourgons (carrying entrenching tools) and 42 draught and 3 riding horses.

Referring now to our army in India, the number of cartridges to be carried by the men is fixed at the same figure as in our Home army, *viz.*, 70 rounds—20 in each of the two side pouches and 30 in the reserve pouch. In addition to above, 30 rounds per rifle are carried as the first reserve, and 100 rounds per rifle as the second reserve, and for their carriage, 20 and 67 mules respectively are provided for in the Equipment Tables. It will be observed from the above that we are generally, and especially so, in comparison with the Russian soldier, at a disadvantage so far as ammunition personally carried is concerned ; that, however, we are on the other hand provided with a much more suitable mode of transport, by employing pack instead of draught carriage for reserve ammunition. To deal with the former subject first, there appears no tangible reason why the number of rounds personally carried should not be considerably augmented. On the contrary, the deductions arrived at as the result of the Russo-Turkish war amply warrant the introduction of the necessary modifications at once, and we should not wait to be taught a practical lesson and thus purchase the needed reform at the cost of bitter experience. Moreover, we believe that whatever considerations led to the fixing of the personal equipment at 70 rounds for our Home army, they do not now apply to our army in India, since there exists the most palpable difference : that on Home service the man is obliged to carry his own kit, whilst in India it is carried for him. This factor should not be

lost sight of, for it is patent that, under such circumstances, a comparison of the proportion of ammunition carried by the army in India with that fixed for our Home and other Continental armies cannot be justly made ; and as a man carries nothing except his own clothing and accoutrements, there should be no hesitation in increasing, very considerably, the number of rounds carried by him. The grave disadvantage under which our troops now go into battle would be immeasurably increased were repeating rifles introduced, as they should be, in our army ; when with a repeating apparatus containing 10 cartridges (this brings the ordinary number which it is considered a repeating rifle should have) a man would find his cartridge supply very soon exhausted, and ordinary reflection must tell us that a conclusion would be forced upon him that it would have been far better for him had more attention been paid to his efficiency in battle than to his personal comfort.

To deal now with the second subject under consideration, namely, the reserve ammunition. It has been shown above that 20 and 67 mules are allotted to each Infantry regiment for the carriage respectively of its first and second reserve ammunition, and that those two reserves combined provide the regiment with one hundred and thirty rounds per rifle. It is obvious that our mode of conveyance of the reserve ammunition is superior to that generally adopted in Continental armies, *viz.*, wheeled carriage. The objections to the latter have already been dealt with in general terms, and for the reasons therein shown the fact is established that all the disadvantages connected with such a system disappear in the case of the pack mules. A good many additional arguments, however, might be adduced in favour of pack transport for reserve ammunition. For instance, if a waggon breaks down, or its horses are killed or otherwise disabled, a very considerable portion of the ammunition is at once lost to the regiment, whilst in the case of pack animals, the distribution connected with it makes the loss of a few animals, comparatively speaking, a trifling one. Again, our system of pack and the description of animals used for the purpose, *viz.*, mules, has undergone so many trials and experiments, that it may be safely asserted that perfection has been reached in this direction. So far, therefore, our Indian army may look with satisfaction and entire trust to the way and manner in which Government has arranged for its supply of reserve ammunition, which it can depend on with certainty, as it will be forthcoming and ready at its disposal in any situation in which the army may find itself. This, we would submit, is a matter of very great consideration to an army. It is obvious that, together with the introduction of arms of precision, the nature of the battle-field to be selected has undergone considerable modification ; and an attacking army will, doubtless, have a much greater chance of success if it selects for its operations broken ground, which will offer it manifold advantages and enable it to approach and engage the enemy without the terrible losses, which, a plain offering no protection, would entail. Such ground offers naturally an insuperable obstacle to wheeled carriage following the troops, whilst a pack mule can get over any ground the Infantry gets over ; and on account of its mobility, be readily placed in a position of

shelter and advantage. Under these circumstances, the question of the ammunition being forthcoming rests entirely with the troops as to whether they fulfil their part of the work in maintaining the materials placed at their disposal in a condition of efficiency; as it is manifest that if, through neglect in the feed and keep of these animals, they become unserviceable and have to be dropped behind, this is a result for which the troops have to blame themselves. It appears a matter of considerable uncertainty whether sufficient attention is paid to, and interest taken in, this matter at present. There can be hardly any doubt that a commanding officer would be in a state of great excitement if he found that a rifle of one of his men could not be worked, owing to its mechanism having been spoilt by rust—the result of neglect: such a state of affairs can scarcely be imagined. But a little reflection would conclusively show that one rifle having been thus rendered unfit for work is comparatively a trifling matter to the loss of a pair of ammunition boxes, which have to be left behind owing to the mule having been disabled through sore back, brought about by neglect; as the loss of 1,200 rounds of ammunition may have a serious influence on the success of an attack, which can scarcely result from the loss of a single rifle. The late Camp of Exercise offered a good opportunity of arriving at a fair and reasonable judgment on this point. A number of mules were handed over to regiments for the conveyance of ammunition, to all appearance in very good condition, but they did not remain so throughout the course of operations in consequence of abrasions, caused evidently through bad packing. Assumed that the packs had been properly adjusted before setting out for the day's work, which appears more than doubtful, since there are very few officers in our army who have undergone a course of instruction and thus acquired the necessary knowledge to enable them to form a proper judgment on this point, loads became loosened during the march. Again, instances occurred in which troops had occasion to have recourse to their ammunition; and to enable this to be effected, the boxes had to be taken off, thus upsetting the original loading arrangement. Want of trained supervision and leaving the work of re-adjustment of the loads to the men told off for escort, who are either too ignorant or apathetic and, moreover, look upon keeping up with the regiment as their primary duty, and thus cause the animals to trot with unadjusted loads to get them in their proper places, must cause abrasions. It appears very desirable that the difficulty, if not impossibility, of replacing animals rendered unfit in this manner should have more attention paid to it. To obtain better results in this direction, it seems advisable that on marching out parades connected with field manœuvres, a certain proportion of mules wherever available, be taken out with the regiment, when the regiment should be held responsible for their return in good condition. There is another point in which improvement is evidently needed, namely, the distribution and position of drivers. The transport follower, as he stands at present, is not an enlisted man, and it seems more than doubtful whether, under these circumstances, that discipline could be expected from him, which alone would ensure a man remaining in his position in the

hour of danger, as it is generally an accepted fact that disregard of danger can only be overcome by the power that discipline enforces on a man's will. But even allowing a man's readiness to do his part, it is questionable whether the work expected from him is not too much. The ordinary complement of a driver to three mules may, for all purposes, suffice for peace manœuvres, but to any one who has a knowledge of how untractable a mule becomes when it is suddenly frightened, it must appear a more than doubtful matter whether a muleteer can efficiently control three animals in all the tumult and noise which is inseparable from a battle. If these conclusions are accepted as true, does it not become a necessity to remedy matters by placing these drivers on a more satisfactory footing by enlisting them and by making a more convenient distribution of animals in their charge. Although we have already stated that mules afford undoubtedly the most efficient description of transport for replenishment of ammunition, the question arises whether the thing is not overdone by allotting pack animals for both the reserves, since it would appear to suffice, if this description of transport were resorted to, for the first reserve only which is required with the regiment, and not for the second reserve which will be kept parked with the baggage, etc., and consequently out of the zone of fire. The considerations which render the use of pack transport in the front line so efficacious, here cease to be of any import. It becomes a question whether, under these circumstances, draught carriage for the second reserve is not preferable. The advantages it offers are obvious, as it admits of a much larger quantity of ammunition being carried. Our Light Army Transport carts are fixed at a carrying capacity of 6 maunds or 6 boxes; and as one mule in draught is equal to three in pack, treble the amount, now carried as a second reserve, might in this manner be carried. Double-draught carts might even be substituted with advantage for the single-draught ones now in use. Whether we introduce repeating rifles or not, the fact that, already under the present circumstances, it would be unwise to limit the quantity of ammunition to be carried within the lines of other Continental armies, becomes plain when we remember that our troops will be more or less constantly employed throughout a campaign; whilst with the large number employed in European warfare, a constant change of the troops actually engaged necessarily takes place.

Closely connected with the question of ammunition is the subject on which of late a good deal of controversy has taken place, namely, should we adopt long range fire tactics, or restrict ourselves to short range tactics, and train our troops accordingly. It appears scarcely feasible to treat this matter by itself, since it is apparent that a question of ammunition is involved therein. The chief reason for which the fire at long ranges can be condemned, is the fear that troops may fire away almost all the ammunition in their possession, forcing them to enter the contest at close quarters with an inadequate supply. Another reason adduced against long range fire is that it is likely to unsteady the troops by tending to make them fire at distances which are actually beyond the range of the rifle. This point, however, deserves scarcely to be dealt with,

since it is evident that only troops very badly trained should be liable to yield to the temptation of firing away at distances beyond their reach; for it is only natural to assume that men so imperfectly trained would also obtain no result at closer distances, as their unsteadiness would prevent their taking aim. This subject, however, shows itself in a different light when troops have been properly trained, and turn out more or less good marksmen, for, whilst on one hand an army will always despise an opponent who fires ineffectually, casualties obtained by a well directed fire at long distances must tell, and must have a demoralizing effect on the enemy. Hence an effective fire at long distances must render good service in the way of preparing for the final assault—an advantage which should not be thrown away. It will be seen that in touching upon this point, the special circumstances, such as are involved in offensive and defensive tactics, have not been taken into consideration. In the latter position, no shortcomings in the way of ammunition should be allowed to take place, since it is selected with the view of obtaining the best possible advantages which modern arms, namely, arms of precision, rapidity of fire and long range capacity, offer. Hence as such a position is carefully selected, it will be adhered to throughout the fighting as much as possible, and consequently not be subject to the sudden changes which must occur in offensive tactics which would frustrate any preparation made beforehand. We would further advance that although an axiom may be acknowledged as a correct one for one army, yet it may be totally out of place with another, and consequently any difference in organization should have due attention paid to it before deciding as to whether it is applicable or otherwise. If a man is only relatively a short time serving with his colours, it is patent that his training and instruction must be confined within certain limits, and can, therefore, not be conducted on such a broad basis as a relatively long service will permit. Other armies with a short period of service consider it doubtful whether it would be preferable to train their men both at long and short ranges, or restrict them to the short range only, in order to obtain efficiency in the latter instead of indifferent results in both; but such reflections are obviously inapplicable to our army in which the men serve for a longer time. Here we approach a subject which also does not strictly lie within the scope of this article, yet is closely connected with the subject under consideration, namely, whether our present musketry instruction is in every way a satisfactory one? Undoubtedly very considerable progress has of late been made in this matter; but when we reflect that it is of paramount importance that we should not alone be satisfied with good results but strive to attain better ones, we should not stop here. Only a man who has confidence that his bullet will hit, will be careful of his ammunition, while to a bad shot, the loss of one or more rounds from his pouch must be a matter of indifference, since he can place no value on it which would make him careful. There are two points in which improvements seem to be feasible. In the first instance, it appears faulty that the musketry course should be confined within a certain period. It is apparent that to make a man fire a fixed number

of cartridges, day after day without taking any cognizance of the fact as to whether the result has been good or bad, must tend to lower the results which would be obtained if more time was given, since after a day's bad practice it is desirable that a pause should be made to allow the man to recover himself and regain confidence. In Native Infantry regiments, it is now common for two parties to fire at the same time, under the superintendence of one European officer, and as the latter can only pay attention to one party at a time, it is evident that particular care is not bestowed upon the subject. The capability of being a marksman and of acquiring high efficiency in shooting is *primâ facie*, a qualification in a soldier which can only be obtained by long and careful training ; and the fact that this turns a man into a good soldier, should be held constantly to his view ; but this end can only be achieved by letting him fire all the year round. If this is conceded, the question coupled therewith might receive consideration, namely, whether it would not be advisable to augment the number of cartridges now allotted for practice, in view to facilitate the opportunities of learning to become a marksman. The importance of this subject is fully recognized by our present Commander-in-Chief, as clearly demonstrated by the fact that he gave the full weight of his influence in the public speech which he made before he left for India, by recommending a greater liberality being exercised in this matter ; but although concessions were made in consequence, these appear open to further improvement, for progress in weapons must naturally go hand in hand with superior training of men, and this, it is submitted, can practically be only accomplished by a liberal allowance of ammunition.

SOME SUGGESTIONS WITH REGARD TO THE ATTACK FORMATION.

By Lieut. G. Chenevix-Trench,

Bombay Staff Corps.

The idea of suggesting some remedies for some of the most obvious faults in our present system of Attack Formation originated in my mind from a leading article of the *Pioneer* of the 31st March, 1886, in which it appears that the general idea of distinguished Generals is, that a more orderly method of advance than the present one is required; so as a preface to these suggestions I cannot do better than quote some extracts from the article in point.

"It will be observed that, while Sir Gerald Graham stands up for the square formation in the particular case he had to deal with, he quite admits that, as against a civilised foe, meaning thereby a foe armed and drilled like ourselves, and having the usual amount of nerves, the open formation should be adopted; but we infer him to imply that the advance should be made in some more orderly way than that which we have adopted from the Germans. * * * It has to be borne in mind that the German system has never yet had a thorough trial. The French, after the first two fights, were disheartened, and did not make a firm stand; the Russian attacks in the war of 1877 were not against other troops standing up in the open, but against intrenched positions; so that it may be said that the tactics for the future have yet to be put to the proof. * * * This is not the place to do more than touch on the application of this discussion to the circumstances of the Indian army and the trial on which it may be called before long to enter; but it is well known that, in the opinion of the Foreign officers who were present at the late manœuvres, our formation, apart from any question of musketry fire, is too thin to meet the solid ranks of the one adversary against whom it is our first business to prepare ourselves. And the question has still to be asked, and the answer calls for the most serious consideration,—Whether, under all the circumstances of the Indian army, and especially its composition and quality, we have yet arrived at a complete solution of the tactical problem?"

Simplicity of movement is most conducive to order in all movements of men when exposed to fire.

In an attack under fire, or even when the attack is only made with blank, there is invariably a tendency towards confusion. In the present attack formation there is much that produces uncertainty and disorder just at the time when confidence and a thorough knowledge of what is needed to be done is most required.

Towards the end of an attack, control over the fire is often lost, even when the ammunition is only blank, and there is no enemy. The fire is

liable to become rapid and useless. Men fire wildly and without word of command. There is a want of confidence and mutual and moral support. The excitement causes men to fire rapidly. The noise of the firing tends to prevent the men from properly hearing the words of command of the section commanders, and often causes a feeling of uncertainty in many men's minds as to what is really wanted of them. The result is disorder and confusion. For these most obvious faults in the present system of attack, there must be some remedy, and I would suggest, only in very rough detail, a few changes in the present system to prevent the confusion, disorder and loss of control over the fire, which are likely to occur.

General principle of present attack formation.

The general principle of the present attack formation is, that each company should have part of its strength in the fighting line, which is an extended line, and the remainder in the support, so that the captain may be able to control both lines, and when the support re-inforces the fighting line, that the men may be of one company, and under one commander.

Substitution of groups or loose sections for extended line.

I would suggest that the general principle of the present attack formation be maintained, but that the long extended line of men in the fighting line be done away with, and that in the place of men separated from each other by three to four yards, there should be groups or loose sections of 9 to 12 men separated from each other, and each commanded by a section commander.

Comparison of loose sections or groups with extended line.

In a company of 20 files, under the present system, if 10 files were in the fighting line and 10 files in support, the 10 files in the fighting line would become 20 men extended in pairs at 3 or 4 paces intervals, covering a length of ground of 40 to 50 yards, with two section commanders. So there would be 20 separate units, all acting more or less independently ; as it is impossible that one section commander could control 10 men under fire, when occupying ground to the length of about 25 yards. Substitute groups or loose sections* of 10 men for the 20 extended men, with intervals of 25 to 30 yards, and there will be a fighting line of the same number of rifles, occupying nearly the same length of ground, but only two separate units, each consisting of a section of 10 men acting together, and commanded by a section commander. Therefore the control of the captain over his fighting line would be easier, and the control of section commanders over 10 men in a group easier than over 10 men in an extended line.

I have taken, as an example, a small company of 40 men, which divided according to custom into four sections, gives each section commander 10 men. It is impossible that one man can control the fire of more than 9 to 12 men in action ; and as the strength of companies

* By groups, or loose sections, is understood 9 to 12 men in single rank close together but not close enough to prevent perfect freedom of action.

varies, so certainly should the number of sections, into which the company is divided, vary. If the company is 80 strong, there should be 8 sections; if 60 strong then 6 sections—always keeping the strength of a section from 9 to 12 men. The number of sections into which the company is to be divided should be ordered before the attack commences, and should be such as to cause the sections always being of a strength of from 9 to 12 men. Under the present system, the strength of a section is according to the strength of the company, as the company is always divided into four sections. Thus the strength of a section of a company of 80 men would be 20 men. No section commander could control the fire of 20 men extended in line.

No. of sections into which a company should be divided.

The section commanders should be all non-commissioned officers; if these are not procurable then old soldiers could be employed.

N. C. O.'s to be used as section commanders.

The subalterns should not command sections, but should be the means of communication between the section commanders and the captain, whose post is in front of his support.

Subalterns to be the means of communication between section commanders and captain.

I have said that the distance between these groups, on loose sections, should be 25 to 30 yards; this in an enclosed country, as a wood, might be reduced, so that the general line is not lost, and in open country might be increased, so that in the event of the section commander finding the fire was too hot, he might be able easily to open out his section without losing control over them, and without allowing his men to get too close to those of another section. He could vary his distance between his men according to the nature of the ground, *i.e.*, drawing them in into a compact, orderly and controllable group when any cover is available, and opening them out when on the open and under heavy fire. He should always bear in mind that the men, and consequently the fire, will be more under control when the men are in a compact body than when extended; so that unless the fire is too hot to be able to advance, the group or loose section formation should be maintained.

Distance between groups.

I believe that this closing in on one another when under cover, and opening out when on the open, is the natural tendency of men when under fire, and in an excited state. Anything that can make a movement, which is a natural tendency, into a disciplined movement, and an object to be gained, ought to be cultivated. Men, when under fire, are liable to act more from a kind of instinct and natural tendency than by the power of cool and disciplined brains.

I am taking it for granted that the state of the majority of men's brains in action is heated and excited. The reason is that practice against a real enemy could alone ensure a cool head in action, and this of course cannot be given as part of a man's training.

The attack formation should be ordered, so that, as far as possible, it should be suited to this unavoidable excitement, and should, as far as possible, follow the lines of what the natural tendency of men causes them to do.

When the fighting line, thus formed into loose sections, is advancing over an unknown country, each section commander should send out one picked man as a scout, to a distance of about 30 to 40 yards in front, but not out of ear-shot. This scout should have no distance to keep from his next scout, but his whole attention should be directed in carefully looking ahead for the enemy. He should act as a feeler to his section, and being in communication with his section commander, he will take his direction from his section. It is his object to warn his own group of any enemy he may see.

Scouts.

If the advance is in an open country the distance of 40 yards between the scout and his section could be increased; but communication must be easily passed from him to his section, by some sign, if out of ear-shot.

The support which, if it is the other half company, will have the same number of groups or sections as the fighting line, should be within easy reach of it, *i.e.*, about 100 to 150 yards in rear. Its groups or loose sections should be opposite the gaps of the fighting line. The men of the fighting line and the support will of course be in rank entire; and, as in the present system, will lie down when under fire.

The support.

I think it would be an advantage if the support always had their bayonets fixed, though carrying their rifle at the trail. They would then be ready, when they had re-inforced the fighting line, to charge; that is to say, assuming that the support is not called into the fighting line until within a short time of the charge. When the support re-inforces the fighting line some time before the final charge and shares in the general advance of the fighting line, I think it would be no disadvantage to have the sections of the support distinguished from those of the fighting line by so simple a method as having bayonets fixed, while those of the original firing line had not.

Supports fixing bayonets.

The original fighting line could, as now, fix bayonets at any time. The support would have, as its weapon, the bayonet in the event of any small party forcing its way through a gap in the fighting line, while the fighting line would be able to fire.

A company of 80 men in attack formation, with half its strength in the fighting line, and the remainder in the support, would be as shown in sketch.

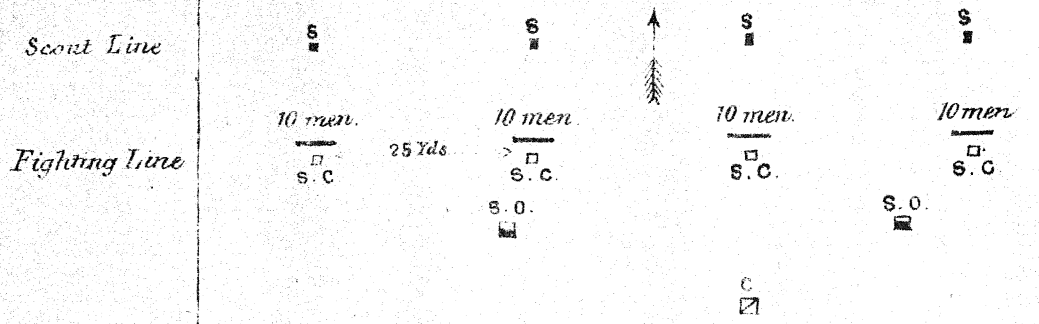
ADVANTAGES OF THE LOOSE SECTIONS OR GROUPS OVER THE LONG EXTENDED LINE.

Greater Control of the Men and consequently of the Fire.

One non-commissioned officer with 10 men, who would not be further from him ordinarily than seven or eight yards, *i.e.*, supposing him to be standing in the centre of the rear of his section, could give his words of command, with reference to firing, with a much greater certainty

Orders more easily heard.

A Company of 80 men extended in Groups or Loose Sections for Attack.



S = Scout
S C = Section Com^{r}
S O = Sub^{n} Officer
C = Captain

of being heard and obeyed than if his 10 men were extended over a line of 30 to 40 yards; the furthest man being 15 to 20 yards away.

Difficulty of right and left hand man of section properly hearing the orders.

When much firing is going on, it is quite impossible that one man's voice can be intelligibly heard at a distance of 20 yards. In a long extended line, the right and left hand men of a section, if they remain in their proper position, must of necessity be 20 yards, or more, away from their own section commander, and only two or three yards further from another section commander. These men cannot feel that there is any real control over their fire, as they probably will hear both their own section commander and the next section commander, each giving the words of command for firing volleys. This is allowing that the voice of the section commander does occasionally reach even the men at 20 yards distance.

Special cautions to be avoided.

Orders are frequently given by section commanders such as "Right Files Fire," or "Left Files Fire." All the men in a section probably don't hear the caution, and, when in an excited state, are liable to forget whether they started as a right file or left file.

Would it not be simpler that each man in a section should be within easy ear-shot of his section commander, and that each section should be so separated that it does not hear intelligibly the cautions and orders given by other section commanders?

The sections, consisting of so few men as 9 to 12, could, when volley firing, always fire simultaneously, and so all such confusing orders as "Right Files Fire," or "Front Rank Fire," could be avoided.

By this system would there not be more order, less confusion and less shouting at the men? Orders, too, would be more readily and easily obeyed.

In comparing the two systems, *viz.*, groups or loose sections with intervals *versus* the extended line, I have only allowed, in the extended line, for 10 men to a section; as a matter of fact double that number is often under one section commander, thereby doubling the difficulties of control, which have been already pointed out.

2. The Fire would be more effective.

Where volleys are good, their results are good. If each man feels that he has a section commander whom he is certain he hears, he would be more ready to obey. There would be less of that uncertainty of action which is the cause of so much bad firing. With a certainty of action comes confidence, and with confidence must come a cooler head, and with that more effective firing.

3. Less confusion.

Confusion is the result of an uncertainty of what is ordered when under fire. Men in extended line are apt to congregate together into masses undivided by sections.

Their section commanders do not know where their sections end or begin. Orders are given and not obeyed. The men are shouted at and become uncertain as to who is ordering them, and what they are ordered to do. The result is confusion. With loose sections or groups the men would not be so likely to mass together into confused masses, undivided by sections, on account of the sections being more clearly defined.

4. Men in small Groups give moral Support to each other.

A small party of 10 men with their section commander, acting together as a unit, and independently of other sections, though with the same object in view, must obtain more moral support from each other than where each man has between himself and the next man a distance of three or four yards. There will not then be, among the men, that feeling of acting alone.

5. Mutual Support.

Men, within easy ear-shot of each other, and of their section commander, will be able much easier to judge the distance of the enemy by watching where the bullets of their volleys fall; and, in the event of ammunition failing any man, how much easier it would be for him to obtain it from those in his section, who would be close to him, than from them, if these were extended in a long line.

6. Greater elasticity of Movement.

100 men in the fighting line are easier moved when they are in 10 small groups than when they are spread out in one long extended line. The movement of men to the right or left, when in extended order, is only carried out by means of many orders, and much shouting, on an ordinary field day. In action would it be far wrong to say that it would be nearly impossible to alter the direction of the attack when once it had begun?

In the group formation, should a captain receive orders to change the direction of his company, he would order his subalterns, who would not be commanding sections, to convey the necessary orders to the section commanders. If the captain had four sections in his fighting line, and two subalterns, each subaltern would only have to convey the order to two section commanders, and see it carried out by those two sections. The section commanders being a part of their own group, the orders would be rapidly conveyed to each man in the fighting line; and when each man knows what is required of him, he, as a rule, does it.

No doubt there are disadvantages to this loose section or group system of attack; but it being allowed that no system can ensure certain success with no risk, and that the least amount of risk may not be compatible with the greatest amount of success, then the question is, which of these two objects should be considered the most important? Why, the system which will ensure the greatest amount of success. In looking at the disadvantages of the loose section, or group system of attack, we should consider, that though there may be a greater amount of risk, whether there is not a still greater amount of advantage in it, if it ensures a better chance of success.

To be unsuccessful is as having risked everything and having lost everything.

Disadvantages.

Group or Loose Sections are better for the Enemy.

In attacking an enemy or an entrenched camp or post, if the country is absolutely open, affording no cover whatever, the task to men either extended, or in groups, is a difficult one.

The fire from the enemy is deadly, and of the two systems groups might certainly be liable to receive a heavier fire than they could stand. In this case, as I have said before, the section commander can at will open out his section, not to such an extent that his men get beyond control, or that his men are liable to touch the next section. The disadvantage of moving in groups is at once thus simply and easily remedied. I should be inclined to think that loose sections, or groups of men lying down, would not be very much better targets to the enemy than an extended line.

If there is a little cover, it will go further to cover groups of 9 to 12 men, than if they were in an extended line ; and so the target offered to the enemy would be less. If the cover is thick, as thick scrub, or wood, the sections can be drawn in closer to each other so as not to lose the general line. The thicker the cover the harder it would be to control the men in extended order, and so the more necessary to have them in groups.

The liability of the Groups of Men becoming too separated and so losing that cohesion which is so necessary in Attack Formation.

The natural tendency of men being to draw in to one another, the tendency of the sections would be rather to close in on one another. This, towards the end of an attack, would be an advantage, as the 30 yards interval, between the firing line groups, could not be entirely filled by the sections or groups from the support.

If the sections of the firing line drew closer in towards the end of an attack, and the sections of the support moved up to re-inforce, the result would be one solid line ready to charge and carry the position.

If the general line of attack was liable to be lost in the group formation, a connecting file could be used between sections.

Finally, numerous small bodies of 10 men would as effectually prevent any concentration of fire from the enemy, as a long line of skirmishers does, the liability of the fire of the enemy being to go above the heads of, or in front of, the fighting line, as the line is a continually moving target to the enemy.

If the advantages of the system of loose sections, or groups, outweigh the disadvantages, and if it be proved that the men in groups are more in hand, and the fire is more effective, than when in extended order, then the group system may become a means by which more order, and less confusion, is obtained than with the present system.

Poona,
April 1886.



THE GERMAN ARMY.

Translated BY MAJOR E. R. ELLES, R.A., *Assistant Quarter-Master-General, from "Les Armées étrangères en campagne, leur formation, leur organisation, leur effectifs et leur uniforms, 1885," by A. Dalby, Lieutenant-Colonel.*

FORMATION OF THE ARMY.

THE German army on a war footing is divided into two principal parts :—

(1.) The Feld Armée, or Field Army, which is composed of the following elements :—

(*a.*) Feld-Truppen, or field troops, are the troops of the permanent army brought up to their war footing.

(*b.*) Feld Reserve-Truppen, or reserve troops, formed at the moment of mobilization from the reservists still available and the best elements of the Landwehr.

(*c.*) Besondere Feld-Formationen, or special field formations, relating exclusively to the artillery and engineer services.

(2.) The "Besatzungs-Armée," or Garrison Army, intended to remain in the country, and the units of which are entirely created at the moment of mobilization. These troops are classed as follows :—

(*a.*) Ersatz-Truppen, or depôt troops.

(*b.*) Besatzungs-Truppen, or garrison troops.

(*c.*) Landsturm-Truppen or "Landsturm."*

These two armies have each the formations necessary for service on the lines of communication and lines of railway; and at the time of mobilization they are formed into commands with their staffs and administrative services. After the army has been mobilized, its formation is determined by the order of battle of the field army and by a statement of the garrisons required for places to be occupied by the garrison army, approved by the Emperor and drawn up in time of peace.

The largest tactical unit on the field of battle is the infantry division, in which, in view to the combat, the various arms are permanently combined.

The infantry division is composed of two brigades, the brigade of two regiments, the regiment of three battalions.

To each infantry division are attached : One regiment of cavalry, four batteries of field artillery, one or two companies of Pioneers, a Pontoon train and ammunition and commissariat columns.

In its bivouac it occupies a space of 173 acres.

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* Landsturm may be termed "Militia."

Two infantry divisions form an army corps, *i.e.*, the unit of operations. The army corps is completed with corps artillery, engineers, Pontoon train, ammunition columns, commissariat columns, ambulance column, field railway service and telegraph corps, transport columns. To one of the infantry divisions of the army corps is attached a battalion of rifles. An army corps bivouacked occupies a space of 370 acres.

The cavalry which is not attached to the infantry divisions forms independent cavalry divisions, composed of three brigades of two regiments of four squadrons each, that is twenty-four squadrons with three horse artillery batteries.

The army corps and independent cavalry divisions are grouped in armies, the number of which varies according to the political and strategical conditions of the time, *i.e.*, of two or more army corps and cavalry divisions.

All the elements exist during peace time for the formation of nineteen army corps, which it is supposed should be divided into four armies.

Regimental Organization.

Infantry.—The German infantry is composed of 161 regiments of three battalions of four companies, each classed as follows :—

9	regiments	of the	Guard.
19	„	„	Grenadiers.
13	„	„	Fusiliers.
120	„	„	Infantry.

The two first battalions of a regiment are numbered 1st and 2nd battalions ; the 3rd is called the Fusilier Battalion, and is only called the 3rd battalion in Fusilier regiments, Bavarian and Saxon regiments, and the 89th Mecklenburg regiment. In the Prussian Guard (except the Fusilier regiment) and in the Grenadier regiments, the men of the first two battalions are called Grenadiers, and in the line regiments Musketeers. But whatever may be the names given to regiments or battalions, there is no difference made in their employment. The names of Grenadiers and Fusiliers are only kept up by a spirit of tradition. The Guard is not a "corps d'élite" in the ordinary sense of the term. The men are well selected, but they are taken from the mass liable to be recruited and not from the regiments of the line. In the regiments the companies are numbered from one to twelve.

A company of infantry is composed as follows :—

Officers	... 5
Under-officers ...	... 20
Drummers and Trumpeters	... 4
Lance-Corporals and Privates	...202
Hospital Attendant ...	... 1
Soldiers of Train ...	... 2
Riding Horses ...	... 2
Draught Horses ...	... 2
Two-horse Carts ...	... 1

The total of a regiment of three battalions on a war footing is :—

Officers	Combatant	69	78	
	Medical	6		
	Paymasters	3		
Troops	Under-officers	244	3,111	
	Musicians, Drummers, Trumpeters	61		
	Armourers	3		
	Rank and File	2,712		
	Hospital Attendants ...	12		
	Soldiers of Train... ...	67		
	Canteen	12		
Horses	Saddle	60	134	
	Draught	74		
Carriages	Regimental Carriages ...	28		

The German infantry also includes 20 battalions of rifles, *viz.* :—

1	Battalion (Jägers)	of the Guard.
1	„	Rifles (Schützen) of the Guard.
11	„	Prussian Rifles (1 to 11).
2	„	Saxon „ (12 & 13).
1	„	Mecklenburg „ (14).
4	„	Bavarians (1 to 4).

The strength of a battalion of rifles is :—

Officers	22
Medical Officers	2
Paymaster	1
Under-officers and men ...	1,031
Horses	40
Carriages	12

The infantry is armed with the infantry rifle of Manser's system, the sight of which is graduated to 1,600 metres (nearly a mile), and the range of which is about 3,000 metres at an angle of 35°.* This rifle is considered equal to the French Gras rifle, pattern of 1874.

The battalions of Rifles are armed with the rifle carbine, which is the same as the Manser infantry rifle, only a little shorter.

Each soldier carries 80 cartridges ; the under-officers 30 only. With the cartridges carried in the vehicles, the supply of ammunition comes up to 111·7 per man and 61·7 per under-officer, without counting the army corps reserves.

In each battalion the men carry 400 small spades, 40 small picks and 20 axes, and on the vehicles are packed 58 large spades, 18 pickaxes, 12 hatchets and 26 axes.

Infantry men carry three days' rations in reserve, which they are not to touch without special orders.

CAVALRY.—The German cavalry comprises 93 regiments, classed as follows :—

Prussian Guard	1	regiment of Body Guard.
	1	„ Cuirassiers.
	2	„ Dragoons.
	1	„ Hussars.
	3	„ Uhlans.

* The whole army is now armed with repeating rifles, including a large number of the Landwehr, 72,000 of the latter having been called out for musketry practice with the new rifle.

German Army ... ... { 8 regiments of Cuirassiers. / 26 „ Dragoons. / 19 „ Hussars. / 22 „ Uhlans. / 1 „ Saxon Reiters. / 1 „ „ Carabineers. / 2 „ Heavy Bavarian. / 6 „ Light „

These regiments are classed in three categories :—

Heavy Cavalry.—10 regiments of Cuirassiers, including one regiment of the Body Guard and one of Cuirassiers of the Guard, and Saxon Reiters and Carabineers.

Cavalry of the Line.—25 regiments of Uhlans and 2 of Heavy Bavarian.

Light Cavalry.—28 regiments of Dragoons, 20 of Hussars and 6 Light Bavarian.

The formation of all the regiments is in five squadrons, four field service and one depôt.

The regiment is commanded by a colonel, a lieutenant-colonel or major, and has a major as second in command.

The staff of the regiment comprises :—

Officers	3		
Medical Officers	3	10	32
Paymasters	1		
Veterinary Surgeons	3		
Under-officers and men	16	22	
Employed men	6		
Horses { Saddle	25		
Horses { Draught	10		
Vehicles	4		

The squadron is commanded by a captain who has under his orders four first and second lieutenants. It is composed as under :—

Officers	5	163
Quarter-Master-Sergeant	1	
Assistant Quarter-Master-Sergeant	1	
Sergeants	4	
Under-officers	8	
Lance-Corporals	20	
Privates	120	
Trumpeters	3	
Hospital Attendant	1	
Horses { Saddle	167	
Horses { Draught	2	
Vehicle	1	

This gives the strength of a four-squadron regiment :—

Officers { Combatant	23	30
Officers { Employed	7	
Under-officers	56	654
Lance-Corporals	80	
Privates	484	
Trumpeters	12	
Employed men	22	
Horses { Saddle	693	
Horses { Draught	18	
Vehicles	8	

The whole of the cavalry is formed in 58 brigades, seven of which are united into three divisions—the Guard Division, Saxon Division and Alsace-Lorraine Division. The other 51 brigades are distributed amongst the army corps and attached to infantry divisions, the numbers of which they bear. The brigades have from two to four regiments, and can be formed into independent cavalry divisions, to which three horse artillery batteries are attached. An independent cavalry division with its artillery has an effective strength of—

Officers	166
Medical Officers	20
Paymasters	7
Veterinary Surgeons	20
Combatants	4,473
Employed men	77
Horses	5,107
Guns	18
Vehicles	101

The Cuirassiers are armed with the straight sword and revolver; 32 men per squadron have the Manser carbine. The Hussars and Dragoons have the curved sabre (steel-handled) and the Manser carbine. Officers and under-officers have the revolver.

The Uhlans are armed with the steel-handled sabre, the Manser carbine, the revolver and a lance 3·15 metres long (10 feet 5 inches), ornamented with a black and white pennant. The carbines are supplied with 50 rounds and the revolvers with 18.

As Pioneer's tools, each regiment has 108 axes carried by the men; 8 large shovels and 6 axes are carried on the vehicles.

Eight privates in each squadron carry a special tool for the destruction of railways and telegraph lines.

All men carry three days' reserve rations.

ARTILLERY.—The artillery is composed of 37 regiments, furnishing 341 batteries, of which 295 are field batteries and 46 horse artillery.

A field battery consists of—

	Officers		5
	Under-officers and men		165
Horses	Saddle	32	150
	Draught	118	
	Guns		6
	Vehicles		12

The horse artillery battery only differs from the above in the number of horses:—

Saddle	116	230
Draught	114	

Field batteries are attached to infantry, and horse artillery to cavalry.

The regiments also have to furnish reserve ammunition columns to ensure the replacement of ammunition expended in the army corps.

The arms of under-officers, drivers and mounted men are the artillery sword and a revolver with ten rounds. Dismounted men have the straight sword, the guard of which is of brass and the sheath of leather. The

dismounted men of the ammunition columns are armed with the rifleman's carbine, with 30 rounds a man.

The artillery carry three days' reserve rations.

Material and Ammunition.

A battery of artillery is composed of—

6 Guns.
8 Waggons.
3 Battery Carriages.
1 Forge.

All the carriages are painted blue.

The projectiles with which the batteries are supplied are of three kinds: common shell, shrapnel and case. The shrapnel are filled with leaden bullets, the case are filled with zinc bullets.

The limber of each gun has in its ammunition box seven cartridges, six light projectiles or five heavy.

The ammunition waggon has in its limber the same as in that of the gun, and in the waggon body; each box has nine projectiles and ten cartridges.

The total complement of each battery is—

Field Battery.—440 common shell, 340 shrapnel, 28 case, 848 cartridges. Total 808 rounds.

Horse Artillery.—528 common shell, 360 shrapnel, 28 case, 916 cartridges. Total 916 rounds.

The extreme range is 7,000 metres (7,655 yards) for the heavy gun and 6,800 metres (7,436 yards) for the light gun.

The infantry reserve ammunition columns of an army corps carry 1,474,560 cartridges. An artillery ammunition column carries 10,290 rounds for the heavy guns, that is for the 84 heavy guns of an army corps 122½ rounds per gun; for the light gun 2,430 rounds, giving for the 18 light guns of an army corps 135 rounds per gun.

The tactical unit is the battery, which is divided into three divisions of two guns each.

Pioneers.

The German Pioneers are formed into 19 battalions, of which 14 are Prussian, 1 Saxon, 1 Wurtemburg, 1 Baden and 2 Bavarian.

Each battalion bears the number of the army corps to which it belongs. The battalion has four companies, except the Bavarian ones which have five.

Each battalion of Pioneers mobilizes—

Three companies of Service Pioneers.
Two divisional bridging trains.
One army corps bridging train.

The Pioneers, except the under-officers, are armed with the rifleman's carbine, a sword bayonet, the back of which has a saw edge; each man has 30 cartridges. Each Pioneer company has a certain number of tools carried by the men and others carried on vehicles.

A company of Pioneers consist of—

	Officers	... 5	
	Under-officers and Privates	... 210	
Horse	Saddle	... 7	19
	Draught	... 12	
	Vehicles	... 4	

A divisional bridging train is sufficient for a bridge 36½ metres (40 yds.) long. With an army corps train, a bridge 122 metres (133 yds.). With the army corps and two divisional trains, a bridge from 195 to 210 metres (213 to 230 yards) long can be constructed.

Train.

The trains of a mobile army corps comprise: The battalion of train, departmental and staff train, and, lastly, the train of the troops.

Germany has 18 battalions and one company of train, or in all 39 companies for the service of the army.

13 battalions are Prussian, 1 Saxon, 1 Wurtemburg, 1 Baden, 2 Bavarian; the 1 company being Hessian.

The battalions bear the number of the army corps to which they belong.

Under-officers, trumpeters and corporals of train who are mounted, workmen, wheel drivers and spare drivers in the provision columns and convoys are armed with a revolver which has lately replaced the carbine they previously had.

Train drivers, mounted and dismounted orderlies, sergeant-majors and assistant sergeant-majors, drummers, trumpeters, hospital attendants, have no firearms.

Under-officers, trumpeters, corporals, drivers and mounted orderlies have a cavalry sword of obsolete pattern; all dismounted men have an obsolete infantry sword.

Administrative Services.

Each mobilized army corps and each independent cavalry division have attached to them the necessary administrative departments under the direction of the intendant of the army corps, who acts on his own responsibility, in accordance with instructions drawn up for the campaign and the orders of the General commanding, under whose orders he is placed. He has to take notice of the dispositions issued by the chief of the staff.

The services of the intendance comprise divisional intendance, treasure chest, commissariat, hospitals (ambulance) and postal service.

Sanitary Service.

The principal medical officer of the army directs the whole of the medical services. He has generally attached to him a consulting surgeon, nominated by the Emperor and selected from amongst those who are the authorities in the profession.

The principal medical officer of the army corps directs the whole sanitary service of the corps.

Each corps d'armée is provided with 12 field hospitals, intended to receive the sick and wounded sent by the sanitary detachments or from corps. The various corps have at their disposal military medical officers, hospital attendants and stretcher-bearers; they have with them medical

carriages, stretchers, dressing and medical cases of various kinds. With this personnel and matériel are organized field hospitals and field dressing stations on the battle-field.

The sick and wounded of the various columns are despatched to the field hospitals, which are either located singly or several together, and then receive the name of permanent field hospitals.

The various societies for aiding the wounded are, in time of war, attached to the sanitary service of the army and subordinated to the authorities, who employ them according to circumstances.

Lines of Communication, Telegraphic and Railway Services.

Each army has a line of communication (Etappen), staff consisting of :—Inspection staff, a section of the medical service, a section of military justice, a section of the veterinary department, a section of telegraphs or lines of communication, a section of post offices, an official of the civil administration and a certain number of commands.

Each of these services is provided with the personnel and matériel necessary for the due performance of its work. The telegraph service comprises : making, repairing and keeping up the telegraphic communications.

The telegraph department on the lines of communication consists of three inspectors and 30 telegraph clerks, 10 overseers, 30 linemen, a column of train consisting of one officer, six under-officers, 49 soldiers, 65 horses, 14 vehicles. This personnel and matériel is divided into two sections—one of construction and the other of reconstruction or repair. The former carries $31\frac{3}{4}$ miles of insulated wire and 1,100 yards of special cable.

The telegraph sections attached to troops in the first line have the same organization. The second section has $46\frac{1}{2}$ miles of conducting wire and 650 insulaters.

A system of outpost telegraphs is organized in the troops of the first line ; it consists of two Morse's printing apparatus placed in direct communication, one with a battery and the other with a soldier's knapsack containing 500 metres (543 yards) of cable. The battery is enclosed in a box easily transported, and remains at the starting station with one of the Morse apparatus. The second apparatus is carried on in front with the cable. An under-officer and two men are sufficient to work this system. One of the men remains at the initial station with one of the apparatus and the battery, the other with the second apparatus and cable case unwinds the cable as he moves forward, and carries a second drum of cable which can be added on to the first cable when it has run out. The under-officer goes on with the second man and carries the second apparatus, which is connected to the cable case. A telephone was also added to this system of telegraphy, but in the German army they now seem disposed to adopt the system of visual signalling.

The direction of the field railway service is placed under the orders of the inspector-general of lines of communication and railways. He has at his disposal, for carrying out this service, a staff and one or more

military railway detachments and certain special troops. The special troops comprise :—

One Prussian regiment of two battalions of four companies, which mobilizes eight companies of construction, four companies of working staff and two of railway mechanics.

One Bavarian company, which mobilizes one company of construction and one of working staff.

Total 9 Construction Companies.
5 Working Staff ,,
2 Mechanic ,,

A construction company comprises :—

Captain Engineer-in-Chief		1
1st, 2nd Lieutenants, line Engineers		2
		4
Mechanical Engineer		1
Telegraph ,,		1
Medical Officer		1
Paymaster		1
Under-officers		25
Buglers		3
Men		172
Hospital Attendant		1
Soldiers of Train		11
Riding Horses		11

And a column of train consisting of—

Under-officer	1
Men	9
Horses	18
Vehicles	5

These companies march with the troops of the first line. Supplementary formations are made in accordance with the necessities of each case.

General effective strengths of Field Troops.

According to the information given by military statistics, the strength of an independent cavalry division is as follows :—

Officers	166
Medical Officers	20
Paymasters	7
Veterinary Surgeons	20
Employed men	77
Men	4,473
Horses	5,107
Guns	18
Vehicles	101

And Germany can mobilize six such independent divisions.

The strength of a mobilized army corps will be—

Officers	828
Medical Officers	165
Paymasters	49
Veterinary Surgeons	34
Employed men	402
Under-officers and men	35,701
Horses	10,617
Guns	96
Vehicles	1,531

And Germany can mobilize 19 such army corps. These are, however, the maximum numbers representing nearly 1,000,000 men for the army of the first line, and which in practice would be reduced to about 800,000 men.

An army corps, composed as we have given above, if it marches on a single road with regulation distances between the various units, would occupy from the point of the advanced guard to the tail of the second column of train a length of 47 miles.

When an army corps starts in a single column on a march of 14 miles, which is about the maximum, the first troops do not reach their destination in less than five hours, the last troops ten hours, the last baggage waggons eleven hours, and the last train vehicles, sixteen hours after the head of the column has started.

In order to form up for assembly or in order of battle on the head or tail of the column, the troops of an infantry division take at least $1\frac{3}{4}$ hours, those of an army corps at least five hours. It only takes half as long to form on the centre of the column.

But in order, as far as possible, to avoid such elongated columns, a corps d'armée is marched on several roads, if they are not more than four to five miles apart, especially if they are not separated by impassable objects.

Reserve Field Troops.

The reserve field troops are intended as an immediate support to the field army. These are composed as follows :—

1*st*.—Of elements belonging to the permanent army and reserve, which have not been employed in the formation of the field army and of depôt troops.

2*nd*.—Of elements formed with men of the youngest classes of the Landwehr available. The men of the Landwehr are fully trained soldiers.

In peace time the Landwehr has no permanent cadres. On mobilization, the cadres of the formations employed are composed of a mixture of officers of the permanent army and officers of the Landwehr and reserve ; on the other hand, a certain number of the latter officers are employed in the troops of the line. The consequence is that, on mobilization, a close admixture of these officers takes place, and no matter what their origin, they form but one corps in which they rank according to their seniority, and in which they all enjoy the same rights of promotion. It is the same with the under-officers. With these elements mobile reserve divisions are formed, composed of four regiments of infantry, one of rifles, one regiment of cavalry, three field batteries and one company of Pioneers ; to these are added the usual auxiliary services. The employment of these reserve divisions is not exactly laid down. They appear to form reserve army corps. There appear to be $18\frac{1}{2}$ of these reserve divisions, and in addition 83 battalions which can be grouped or not into regiments and allotted to the garrison army.

The reserve field troops are armed in the same manner as the field army.

General Services.

The German army possesses, in addition to the auxiliary services attached to army corps, an organization for the service of lines of

communications and railways; a department of military telegraphy; a department of field post offices; an intelligence department. The authority of the chief of the general staff, assisted by the quarter-master-general, constitutes a central authority which concentrates in its hands the direction of all the great services, and confides the particular direction of each branch of these services to chiefs, the limits of whose powers is precisely fixed.

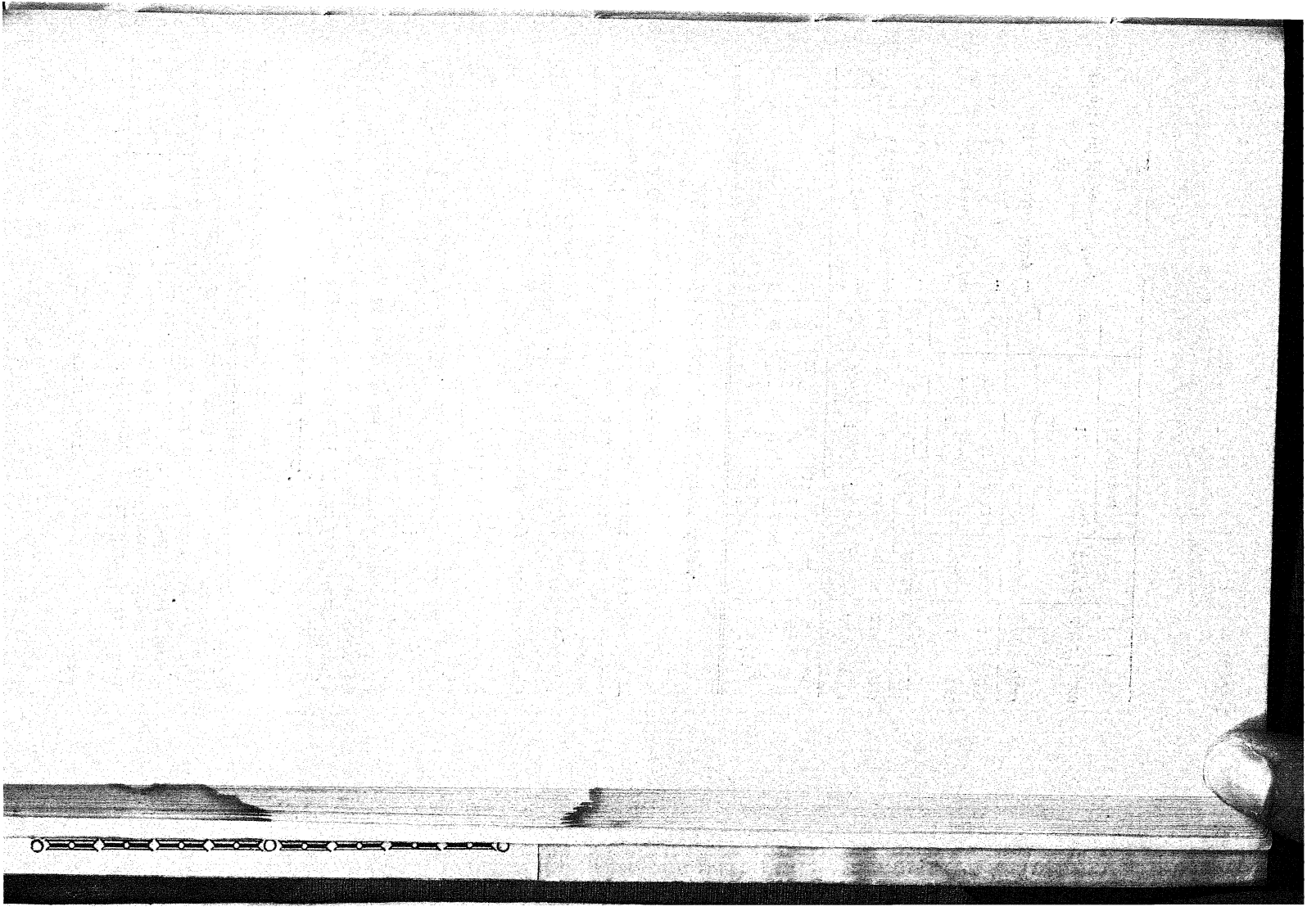
The Garrison Army.

By an order of the Emperors, the men of the Landsturm, that is all men between 17 and 42 who do not belong either to the army or navy, can be called out to complete the Landwehr formations and to provide special formations, whose *rôle* it is to occupy the frontiers, country generally and coasts; to serve as depôts and render all the troops of the Landwehr available for service. In extreme cases, the Landsturm can be employed in the field. German authors state that the Empire can count on 2½ millions of men fit for service, both from a physical point of view and from that of military training. With these powerful resources, 300 battalions of infantry and 100 of cavalry could be formed; but these data are very uncertain.

The probable armament of the Landsturm would be the converted needle gun, of Dreyse's system, with bayonet. Officers desirous of mastering the complete organization and functions of the German army in the field might consult, with advantage, a work by Mr. Rivière—"L'Armée Allemande sur le pied de guerre."

Résumé of the strength of the German Army.

	Officers.	Medical Officers.	Employed.	Under-officers and men.	Horses.	Guns.	Vehicles.
Field Army — Field Troops ...	19,383	3,875	12,035	793,637	260,978	2,846	32,016
Field Army — Field Reserve Troops	10,979	1,760	4,737	419,290	95,350	1,002	13,695
Total of Field Army ...	30,362	5,635	16,772	1,212,977	356,328	3,848	45,711
			1,265,746	men.			
Garrison Army — Depôt and Garrison Troops.	8,491	881	2,075	508,245	35,082	444	961
Garrison Army — Landsturm ...	6,248	583	572	282,722	5,258	132	264
Total of Garrison Army ...	14,739	1,464	2,647	790,967	40,340	576	1,225
			809,817	men.			
Grand total of German Army	45,001	5,099	19,419	2,003,944	396,668	4,424	46,936
			2,075,563	men.			



THE RUSSIAN ARMY FROM NOTES ON MILITARY ADMINISTRATION.

By Major-General Labko, *of the General Staff, Russian Army, late Professor of Military Administration.*

Translated by Major E. R. Elles, R.A., A.-Q.-M.-G.

Organization.

The whole of the Russian land forces, according to the nature of their service, are divided into regular and irregular troops, and by arms of the service into infantry, cavalry, artillery and engineer. According to the object for which they are intended the regular troops are divided into four categories, each of which has its own special organization suitable to this object, *viz.*:—

(*a.*) Field or active troops intended chiefly for warlike operations against an enemy, and despatched in view to the attainment of the main strategic aim of the war. They must always be in constant readiness to receive the first attack of their adversary, on the declaration of war, and it is consequently necessary that they should be capable of being rapidly placed on a war footing and have the greatest possible mobility.

(*b.*) The reserve troops are intended, firstly, in case of necessity or of the extensive development of the war, to increase the strength of the armies operating in the field; and, secondly, to carry out various secondary and auxiliary operations of war, such as the defence of their out-fortresses, the blockade and occupation of hostile fortresses, securing the rear of the operating army and maintaining their communications, the preservation of order and peace amongst the population of the enemy's territory occupied, and, finally, internal duty in their own country denuded of troops owing to the concentration of the field army in the theatre of war.

(*c.*) Depôt troops are intended to prepare, form and despatch to the theatre of war re-inforcements to replace the waste caused in the ranks of the field and reserve troops during active operations.

(*d.*) Units and detachments of the auxiliary services which have no fighting importance, either in a primary or secondary degree, but which an army cannot do without either in peace time or during war.

To these belong disciplinary battalions and companies, police details and detachments, the hospital and sanitary detachments, and the detachments of servants and workmen in the various interior economy establishments.

The number of each unit and, consequently, of the whole army is fixed by law, and is called the established strength. In peace time, from economic motives, troops are not kept up to the strength which is necessary for them in time of war, and consequently there is a peace and war

established strength for every unit. With the enormous armies which are mobilised in the event of war in the present day, no power is in a position to maintain the whole army, permanently, on a war strength, and consequently the army in peace only comprises one-third or one-fourth of the armed forces mobilised in time of war.

In Russia, in peace time, the full number of all administrative units and their sub-divisions is maintained, commencing from the company and squadron up to the army corps; similarly the full complement of commanders and their staffs is always kept up, so that in time of war it is only necessary to add to the existing units about one-half the complement of the lower ranks and a small number of the junior officers.

For the reserve troops the cadres are maintained at a much lower strength and do not go above the battalion. In time of war these battalions are expanded into regiments, and from the latter are formed brigades and divisions. The numercial strength of the cadres is fixed at a much lower rate and is, in fact, only about one-tenth of the number to which the reserve troops are expanded in time of war.

Finally, the depôt troops are not maintained at all in peace time and are only formed on the outbreak of war. The strength of the cadres, too, is not the same for all branches of the service, but depends on the degree of difficulty in training men for service. The lowest cadres are in the infantry, then in the engineers, then the artillery, and, finally, the cavalry have always in peace the same establishments which are necessary in time of war.

Placing the army on a war footing consists in increasing its units to the established war strength in men and horses and in completing its matériel, *i.e.*, uniform, equipment and armament to the war complement. The personnel is brought up to the war establishment by calling out the officers and lower ranks who have served the prescribed time in the army and have been passed into the reserve with the liability of having to present themselves at the first call of the Government.

These persons, in accordance with lists prepared beforehand in peace time, are either detailed to complete the units, whose cadres are kept up in peace time, or to form new units which have not got permanent cadres. The completion of the army to the war establishment of horses is carried out by means of the special law by which there is an obligation on the people at large to furnish the requisite number of horses in time of war on payment for them of a fixed price from the Treasury. The required matériel is supplied from the so-called "inviolable reserves," which consist of complete supplies of all matériel for the difference between the peace and war establishments of the army. For those units, which have cadres, these reserve supplies are in charge of the units themselves, and they are responsible for them, and for units which have no peace cadres the stores are kept at the points of formation of these units. Having glanced at the basis on which the Russian army is organized, we will pass on to the composition and numbers of the troops, dividing them into the four categories given above and taking them by arms of the service.

FIELD TROOPS.

I.—Infantry.

The field service infantry consists of infantry divisions, rifle and line brigades and detached line battalions.

(*a.*) In the Russian army there are in all 48 infantry divisions, *viz.*, 3 of the Guard, 4 Grenadier and 41 army divisions. The Guard divisions are numbered 1st, 2nd, 3rd, the Grenadier divisions 1st, 2nd, 3rd, and the Caucasus Grenadier division ; the army divisions are simply called infantry divisions, and are numbered from 1 to 41. Each division is divided into two brigades, and consists of four regiments (two to a brigade). The brigades of each division are numbered as the 1st and 2nd brigade of such and such a division. The Guard regiments have each their own special name ; the Grenadier and army regiments, in addition to their own name, have a special number ;* the numbering runs through the Grenadier regiments from 1 to 16, and through the army regiments from 1 to 164. Each regiment consists of four battalions numbered from 1 to 4. Each battalion has four companies which are numbered, but the numbering runs through the regiment, according to the seniority of the battalions, from 1 to 16.

(*b.*) Of rifle brigades there are 11, *viz.*, one of the Guard, 5 rifle brigades numbered from 1 to 5, 1 Caucasian, 1 Trans-Caucasian, 1 Turkestan and 2 East Siberian. Each brigade consists of 4 rifle battalions† which bear a number ; the numbering of the 5 brigades located in European Russia is, however, from 1 to 20, whilst in the Caucasus, Trans-Caucasus, Turkestan and East Siberia they are numbered *seriatim* in the province as 1st Caucasus rifle battalion, 3rd Turkestan rifle battalion, 8th East Siberian rifle battalion. In addition to these there are 8 separate Finland rifle battalions under the special commandant of the Finland‡ troops. Each of the 54 rifle battalions has 4 companies.

(*c.*) Line battalions are maintained in three distant military circles in Asia. They are called the Turkestan, West Siberian and East Siberian battalions ; they are in addition numbered in their own provinces. The number of these battalions is 32 in all, *viz.*, 20 Turkestan, 8 West Siberian and 4 East Siberian, in each of which there are 4 companies. The greater part of the Turkestan (17) battalions and West Siberian (5) battalions are formed into brigades (4 Turkestan and 1 West Siberian line brigades).

The number of the infantry units is fixed at two different strengths—the peace and war establishments ; the distinction is in the difference of files in the company. On a war strength, in infantry regiments, there are 100 files per company ; on a peace strength 48 files. Besides these there are, in each company, on a peace strength 4 and on a war

* In the 3rd Grenadier infantry division are two Grenadier regiments which have no numbers.

† Except the Trans-Caucasian brigade, which has 6 battalions.

‡ The Finland troops are separate from the Russian army, have special regulations regarding conscription and have a special commandant.

strength 15 unarmed men employed in interior economy duties and as officers' servants.

	Peace strength.	War strength.
Battalion	400	860
Company	100	215

Rifle and line battalions also have two establishments, similar to the above.

If to the number of rank and file you add the under-officers, volunteers, drummers and buglers, and also the non-combatants, such as cooks, mechanics, train men, the full strength of an infantry regiment is :—

On a peace strength	1,899
„ war „	3,977

In a rifle battalion the strength is—

Peace strength	478
War „	1,002

The following is the provision for supply of ammunition in the field :—

Carried by the soldier	84 rounds.
„ in the battalion ammunition carts in 4 four-horse waggons	60 „
„ in divisional ammunition column in four-horse waggons	52 „
„ in army corps ammunition column in four-horse waggons	13 „
Total ...	202 rounds.

II.—Cavalry.

The field service cavalry consists of 17 cavalry divisions, *viz.*, 1st and 2nd Guard, 14 Army and the Caucasus division. There are also always mobilized three Cossack divisions, one of Don Cossacks and 2 of Caucasus. Thus there are in all 20 cavalry divisions.

In addition to these there are 18 separate Cossack regiments always in the service (chiefly for duty in the Caucasus and in distant provinces); of these 3 Kuban Cossack regiments form the Kuban Cossack brigade; 3 Terck Cossack regiments, the Terck Cossack brigade; and the Cossacks of the Trans-Caucasus, the Trans-Caucasus Cossack brigade.

The 1st cavalry division of the Guard consists of 4 Cuirassier regiments and two Don Cossack regiments of the Guard. The 2nd cavalry division of the Guard consists of 6 regiments, *viz.*, one mounted Grenadier, one Dragoon, 2 Uhlan, 2 Hussars and the Ural Cossack Life Guard squadron. Each of the 14 army cavalry divisions consists of 4 regiments, 3 Dragoon and 1 Cossack; the Caucasus cavalry division consists of 4 Dragoon regiments; the Don Cossack division of 4 Don Cossack regiments; the 1st Caucasus cavalry division of 3 Kuban and 1 Terck Cossack regiments; and the 2nd Caucasus Cavalry division of 4 Kuban Cossack regiments.

The division is divided into 2 brigades, each of which consists of 2 regiments; in the 14 army divisions the 1st brigade has 2 Dragoon and the 2nd brigade 1 Dragoon and 1 Cossack regiment. The Guard regiments have each special names, and the army regiments, besides

a name, have a number; in the Dragoon regiments these numbers run from 1 to 46. Each regiment consists of 6 squadrons* and each squadron is divided into 4 sections.

Cavalry regiments have only one established strength, at which they are always maintained, *viz.*, 16 files per section, and the whole regiment on a war strength comes to 948 of the lower ranks and 940 horses. In addition to these, in peace time, each regiment maintains 123 dismounted men who are intended to perform non-combatant duties, such as servants to officers, clerks, &c.

III.—Artillery.

The field artillery is divided into *foot* (field batteries) and horse artillery.

The foot artillery consists of 48 brigades, corresponding to the number of infantry divisions, *viz.*, 3 Guard, 4 Grenadier and 41 army. Each brigade has a number similar to the number of the infantry division to which it is attached. A brigade consists of 6 batteries, which are numbered from 1 to 6 in each brigade.

The first 2 batteries of each brigade are armed with battery (heavy guns), the remaining 4 batteries with light guns.† The battery consists of 8 guns and is divided into 4 divisions. Both the heavy and light guns are rifled steel breech-loaders, capable of long range fire.

The foot artillery (field batteries) have two established strengths, *viz* :—

War strength.—Men for all 4 divisions, horses for the 8 guns and the full number of ammunition waggons (in heavy batteries 16, in light 12 waggons).‡

Peace strength.—Men for 4 divisions at diminished strength, and horses for 4 guns.

The horse artillery, for use with cavalry, consists of 28 batteries, *viz.*, 5 of the Guard and 23 of the Line. Besides these there are always mobilized 20 Cossack batteries, one of which is the Guard battery of Don Cossacks. The 6 Guard batteries form the Guard horse artillery brigade belonging to the Guard army corps. The remaining horse artillery batteries are distributed to the corps to the number of 2 to each cavalry division.

The horse artillery is armed with the horse artillery gun, a rifled steel breech-loader. Each battery has 6 guns and two established strengths.

War strength.—Men for 3 divisions, horses for all guns and waggons (6 per battery).

Peace strength.—Men for 3 divisions, horses for all the guns and for 2 waggons.

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* Except Cuirassier regiments which have only 4.

† In the 13th, 19th, 20th, 21st, 38th and 39th brigades the 5th and 6th batteries are armed with mountain guns. There are also 3 mountain batteries in the Kiev garrison artillery.

‡ Each heavy or light gun is drawn by 6 horses, also each ammunition waggon.

There are also the following details for local service in distant provinces :—

1. Turkestan field artillery brigade of 7 batteries.
2. West Siberian field „ „ „ 4 „
3. East Siberian „ „ „ „ 4 „
4. Two horse mountain batteries—one in the Turkestan and one in the Omsk districts.

The artillery parks or reserve ammunition columns are also in charge of the artillery. Each infantry division, with its artillery, has a flying park brigade of 4 flying parks—two of artillery and two of infantry ammunition. Each cavalry division has a separate cavalry flying park. The flying parks, for the replenishment of ammunition used in action, follow the troops everywhere, even on to the battle-field. They are refilled from the *mobile parks*, a number of which, equal to the number of infantry divisions, are attached to the army. The *mobile parks* are in their turn re-stocked from the stationary artillery stores.

There are also under the artillery 3 siege parks, the 1st, 2nd and Caucasus ; they consist of guns of large calibre and all material necessary for besieging an enemy's fortresses.

The number of rounds carried for artillery is —

	With Battery.	1st Ammunition Column.	2nd Ammunition Column.	Total.
Heavy ...	126	108	36	270
Light ...	165	135	43	343

Of the rounds with the battery the nature is :—

	Heavy.	Light.
Common shells	57	78
Shrapnel	63	82
Case	6	5
	126	165

IV.—Engineers.

The field service engineers consist of 17 Sapper battalions,* 8 pontoon battalions, 6 railway battalions,† 16 military telegraph parks and 6 field engineer parks.

All these troops and technical units are formed into 6 Sapper brigades, which are numbered 1, 2, 3, 4, 5, and the Caucasus brigade. The brigades are not all of the same composition.

The 2nd, 3rd and 4th brigades consist of 3 Sapper, 2 pontoon, 1 railway battalion, 3 telegraph parks and 1 field engineer park. The 1st brigade has 1 pontoon battalion less. In the 5th brigade there is no railway battalion. The Caucasus brigade has 2 Sapper battalions, 1 telegraph and 1 field engineer park.

A Sapper battalion on a peace strength has 5 companies, and on a war strength 4 ; the 5th company on mobilization is detached to form reserve Sapper units. There is a double establishment.

* In addition there are the Turkestan Sapper half battalion and the West and East Siberian Sapper companies.

† Includes 2 Trans-Caspian not included in the brigades.

Peace strength.—50 files per company and 8 unarmed men.

War strength.—100 files and 15 unarmed men.

A pontoon battalion has two companies and two establishments—

Peace.—50 files per company and 8 unarmed men.

War.—76 files and 14 unarmed men.

And on mobilization 144 drivers are attached from the cavalry reserve. A railway battalion has 4 companies, two of which are *construction* and 2 *reconnoitring* or prospecting companies. The telegraph parks have an establishment of *personnel* and *matériel*, necessary for the construction of a line of 65 versts (43⅓ miles), and can be split up into two separate divisions.

The field engineer park is formed in two divisions, and has a reserve of entrenching tools for 10 infantry divisions and 10 Sapper companies.

There are in addition to the above units—

(*a.*) Two siege engineer parks, consisting of 4 divisions each; each division has sufficient tools, &c., for the siege of a fortress.

(*b.*) Four mining companies for sub-marine mining in the ports of the Baltic and Black Seas.

Formation of Corps.

The Russian field army is formed into 19 corps, *viz.*, the Guard corps, the Grenadier corps, 15 army corps and 2 Caucasus corps. The army corps are numbered from 1 to 15; the Caucasus corps 1 and 2.

Each corps consists of 2 or 3 infantry divisions, one cavalry division and the proper number of artillery units. The Rifle and Sapper brigades do not form part of the army corps.

RESERVE TROOPS.

The reserve troops are intended for the following purposes:—As a support to the field troops, for the maintenance of garrisons in fortresses and other fortified points, and for carrying on the duties of internal service. They consist of infantry, field artillery and Sappers.

The *Reserve Infantry* consists of the Guard and 96 army reserve (cadre) battalions, numbered from 1 to 96.

In peace time each battalion consists of 5 companies of 40 files per company, with 8 unarmed men. The companies are distributed throughout district towns for internal duties, and the battalion staff are chiefly located in the chief towns of Governments, and fortresses, as far as possible, centrically situated with regard to the companies. With the battalion staff one company, at least, is left, and the reserve stores for the whole battalion. On mobilization the companies are concentrated at their battalion head-quarters and there brought up to a war footing. By drawing officers and men from the general reserves, the cadre battalions are so expanded that each section of a company becomes a whole company of 100 files with 15 non-combatants, and each company thus forms a whole battalion on a war footing; consequently each cadre battalion forms 5 battalions, each numbering 860 rank and file. Of these mobilized

5 battalions 4 form an infantry regiment, which can at once move to the theatre of operations or wherever circumstances may require; the 5th battalion remains for local service until it can be relieved by the drujina or battalions of militia, when it also becomes available for service.

The reserve regiments, according to lists prepared in peace time, are formed into infantry divisions, each of which is divided into 2 brigades of 2 regiments each.

These newly-formed divisions are numbered after the field army divisions, commencing from 42, and the regiments composing them are numbered after the field infantry regiments, commencing with 165.

By this system of reserves the 48 divisions of the field army can be reinforced, in the theatre of war, by fresh divisions. The organization of both field and reserve divisions is the same. Each consists of 4 regiments in 2 brigades, each regiment of 4 battalions, and each battalion of 4 companies. Their mobility is the same as they are furnished with the same kind of train and to the same extent. Nevertheless, in their degree of fitness and capability for the most important operations of war, they must always give place to the field army owing to the cadres maintained for them in peace time being so much weaker. In addition to the above there are 6 reserve infantry (cadre) battalions in the Caucasus, which are in an exactly similar manner expanded into 6 regiments.

The *Reserve Artillery* consists, in peace time, of 6 reserve foot artillery brigades (field batteries), each having 6 batteries or 36 batteries in all.

In war time the reserve artillery units are so expanded that each division of 2 guns is expanded into a whole battery, each battery thus forming 4, and each reserve brigade 24. Of these 24 batteries 16 are attached to the reserve infantry divisions and 8 are termed *depôt batteries*, and remain local for replenishing the waste in the artillery of the field army.

In this manner 96 reserve and 48 depôt batteries are formed. The reserve batteries are formed into 24 brigades of 4 each, and attached to the 24 reserve infantry divisions; they are numbered after the field artillery brigades, commencing with 42. Each brigade has 2 batteries of heavy field and 2 of light field guns with 8 guns to a battery.

The *Reserve Engineers* consist of 34 reserve Sapper companies which are formed, in time of war, from the 5th companies of each of the 17 Sapper battalions of the field army; thus each 5th company is expanded into two reserve companies. Of these 34 companies 16 are used on the lines of communications, in rear of the army, and 18 are for use in fortresses.

In addition to the above troops there are—

1. Local troops:—
   - (*a.*) Local battalions in certain distant Government towns of European Russia, the Caucasus and Siberia; there are 13 in all.
   - (*b.*) Local detachments.
   - (*c.*) Convoy detachments for prisoners.
2. Garrison artillery consisting of 52 garrison artillery battalions.

DEPOT TROOPS.

The object of the depôt troops is to train and despatch, to the theatre of war, detachments to replenish the waste in the field and reserve troops. Each arm of the service has its depôts.

(*a.*) Infantry depôt troops consist of the infantry depôt battalions of the Guard and Line, and the Rifle depôt battalions of the Guard and Line.

The number of these battalions is equal to that of the infantry regiments and rifle brigades of the field army, *viz.*. 199 battalions.

Depôt battalions do not exist in peace time but are formed when the army is placed on a war footing. Each battalion has two kinds of establishment—*permanent* and *temporary*. For the permanent establishment every regiment and rifle brigade of the field army detaches, as a cadre, 1 staff officer, 6 officers and not less than 40 rank and file* ; these form the training establishment. The temporary establishment consists of officers and men from the general reserve or from the militia of the first category or from conscripts. The reserves of matériel for these depôt battalions are maintained with the regiments to which they belong and are termed "inviolable stores."

(*b*). The cavalry depôts consist of 18 cavalry depôt cadres.† Each cadre has divisions corresponding to each cavalry regiment; there are thus three divisions,‡ except in the 1st Guard cavalry depôt and the Caucasus cavalry depôt which have four.

On mobilization each division is at once formed into 2 squadrons of 20 files to a section (80 per squadron), and men are trained for a 3rd squadron. Officers and men are obtained from the general reserve ; horses under the law for horse-conscription. The field army is replenished either by whole squadrons or by detachments.

These cavalry depôts are brigaded in 8 brigades, *viz.*, 1 of the Guard and 7 of the Line.

(*c*). *Artillery depôts.*—Under reserve troops, it has been stated that 48 batteries are detailed as depôt batteries corresponding to the number of artillery brigades of the field army. In order to provide depôts for horse artillery the 6th battery of each reserve artillery brigade has, in peace time, one division of horse artillery which, in war time, is expanded into a battery of 3 divisions of field and 1 of horse artillery.

(*d*). *Engineer depôts.*—On mobilization 4 Sapper battalions of 4 companies each are formed by detailing cadres of officers and rank and file from the 1st, 2nd, 3rd and 5th Sapper brigades ; rolls of these cadres are kept in peace time.

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* These are all detailed in peace time.

† One to each cavalry division, except the 2nd cavalry division of the Guard, which, having 6 regiments, has 2 cadres.

‡ The 4th regiment of the division is a Cossack one.

IRREGULAR TROOPS.

In these are included—

1. Cossack troops.
2. Native ,,

I.—Cossack Troops.

On the southern and south-eastern borders of Russia, partly owing to historic causes, and partly as the result of the administrative measures of Government, a numerous and warlike population has been formed, known as Cossacks, and inhabiting provinces usually known as Cossack "Voiskos," of which there are the following (in order of their numerical strength) :—

Don, Kuban, Orenburg, Trans-Baikal, Terck, Ural, Siberian, Astrakhan, Amur and Semiraichia. The commander of all these Voiskos is His Majesty the Czar, who is known as the "Ataman" of all the Cossack troops. Each Voisko is under its own "Ataman" who holds civil as well as military powers of Government.

The population of the various Cossack territories furnish, on a war footing, 135 cavalry regiments, 33 detached "sotnias" (or squadrons), 12 infantry battalions and 38 horse artillery batteries with an established strength of 160,000 rank and file. On a peace strength only a portion (about $\frac{1}{3}$) of these regiments, battalions and batteries are mobilized, the remainder being exempted for peaceful occupations.

The most numerous of the Cossack "Voiskos," that of the Don, furnishes, in time of war, 48 cavalry regiments and 22 batteries, of which, on a peace footing, there are 17 regiments and 8 batteries mobilized.

II.—Native Troops.

The native troops consists of some bodies for local service raised from the races of the Caucasus and the Turkomans and variously organized.

THE IMPERIAL MILITIA.

Under exceptional circumstances recourse may be had to calling out the Imperial militia. This militia consist of foot "drujinas" containing four companies, numbering from 660 to 1,000 men, and mounted "sotnias" of 120 men. All males between 21 and 40 years of age, not enrolled in the army or its general reserve, belong to the militia. It is evident that the numbers enrolled in the militia will always greatly exceed requirements, consequently the Imperial edict, calling out the militia, sets forth the number of "drujinas" and "sotnias" to be furnished by each Government.

According to a French source of information* the composition of an army corps is as follows :—

	Combatants.	Non-Combatants.	Total.	Horses.	Guns.
Staff { Army Corps ...	16	35	51		
Staff { 2 Divisions Infantry ...	10	24	34		
Staff { 4 Brigades „ ...	4	...	4		
Staff { 2 „ Artillery ...	6	44	50		
Staff { 1 Division Cavalry ...	4	11	15		
Staff { 2 Brigades „ ...	2	...	2		
2 Divisions Infantry ...	31,568	936	32,504	1,488	
2 Brigades Field Artillery ...	2,904	288	3,192	3,192	96
1 Division Cavalry ...	2,976	364	3,340	2,824	
2 Batteries Horse Artillery ...	370	52	422	460	12
1 Battalion Rifles ...	981	44	1,025	61	
Engineers	1,871	337	2,208	1,233	
2 Divisions Artillery Train, (Ammunition) ...	1,424	196	1,660	1,828	
1 Section Park for Cavalry Division	142	19	161	177	
¼ Section Park for Rifles ...	25	5	30	32	
2 Divisional Ambulance ...	...	446	446	460	
	42,303	2,791	45,094	10,755	108

The general effective strength of the Russian army is given as—

General Departments ...			Officers ...	12,678	103,534
			Officials ...	840	
			Men ...	90,016	
			Horses ...	11,391	
			Vehicles ...	2,389	
Active Army ...	Combatants ...		Officers ...	22,431	1,137,479
			Men ...	1,035,442	
	Non-Combatants ...		Officials ...	2,356	
			Men ...	79,250	
			Guns ...	2,624	
			Horses ...	263,803	
			Vehicles ...	35,266	
Reserve Army ...	Combatants ...		Officers ...	20,979	1,064,018
			Men ...	954,053	
	Non-Combatants ...		Officials ...	1,831	
			Men ...	87,155	
			Guns ...	1,170	
			Horses ...	55,049	
			Vehicles ...	7,086	

* Les Armées étrangères by A. Dalby, Paris, 1885.

Frontier Battalions	Combatants	Officers	891	41,486
		Men	36,648	
	Non-Combatants	Officials	147	
		Men	3,800	
		Horses	2,618	
		Vehicles	675	
Cossacks	Combatants	Officers	3,578	142,821
		Men	139,243	
		Guns	192	
		Horses	131,725	
		Total		2,489,338

This formidable army, regularly organized, provided with all accessories and 3,986 guns, would still leave behind it a territorial reserve of nearly 2,000,000, who would find in their depôts the necessary equipment and armament, if the defence of Russian territory called for a powerful effort. After this second line, and as a last resource, the national militia would give another 1,200,000 men.*

THE RECRUITING OF THE ARMY.

Every male between 21 and 40 years of age in the Russian empire is liable to serve in the army or navy ; obligatory service is personal, and exemption by money payment or exchanges is not allowed. There are, however, the usual exceptions and exemptions to service, such as those medically unfit, those who are the only support of their families, &c. The term of service, with the colours, is further shortened for persons passing certain educational courses and for volunteers. The general term of service in the permanent army is 15 years, but only 6 years are passed actually in the service with the colors ; for the remaining 9 years the men are enrolled in the general reserve and live at their homes. Men are, however, often sent to the reserve under 6 years,† and may further be granted furlough amounting to one year. The men of the reserve can be called out for training, but not oftener than twice during their service ; in time of war they are liable to be called out. For the remaining 4 years, during which they are liable to serve their country (up to 40 years of age), men belong to the militia. The conscription takes place annually from 1st November to 15th December, and all men reaching the age of 21, in the current year, are called up according to previously prepared lists.

Putting the peace establishments of the army at 760,000 men and limiting the period of service, with the colors, to 5 years, about 190,000 conscripts are required annually. The number of young men, in Russia, attaining the age of 21 annually is about 800,000, so only about one-fourth of these are required for the service. About one-third of the total number

* *Note.*—This army is regularly organised and equipped *on paper*, but as militating against its efficiency there are two powerful factors :—

(1.) The corruption known to exist in all departments in Russia.

(2.) The bankrupt condition of the finances.

It is believed that Russia was nearly at the end of her resources during the Turkish war of 1877-78.

† In 1885 after 5 years.

are, however, unfit from various causes, consequently there remain 535,000 from whom to select the annual contingent. After taking into account the exemptions and limitation of service, from causes other than unfitness, the number of conscripts required is selected by lot.

Obligatory Military Service of the Cossacks.

The rules regarding service vary slightly in the various Cossack "Voiskos," but those in force with the Don Cossacks, the most numerous "Voisko," may be given as the general type.

The armed forces of the Don "Voisko" is divided into service establishments and militia. The service establishment is divided into 3 classes :—

(*a.*) *Preparatory* class in which Cossacks receive preparatory training or service.

(*b.*) *Fighting* class from which the mobilized regiments and batteries are recruited.

(*c.*) *Reserve* class intended to replenish the waste in the fighting ranks, in war time, and also to form special units and detachments.

Every Cossack commences service at 18 and serves for 20 years, *viz.*, 3 years in the preparatory class, 12 years in the fighting class, and 5 in the reserve.

The fighting class is again divided into three categories, of which the first only actually serves in peace time. Thus each Cossack is liable to service as under :—

		No. of years.	From
In Preparatory Class		... 3	... 18 to 21
„ Fighting Class	1st Category	... 4	... 21 „ 25
	2nd Category	... 4	... 25 „ 29
	3rd Category	... 4	... 29 „ 33
„ Reserve Class		... 5	... 33 „ 38

Men in the 1st category of the fighting class have to maintain their uniform and equipment of the established patterns and their own horse. Those of the 2nd and 3rd categories are only liable to serve in war or when required and live at their homes. Men of the former have to maintain their uniform, equipment, arms and horses ; they are called out for training annually for three weeks in May, and can consequently be mobilized at any moment. Men of the 3rd category have to maintain their unform, arms and equipment, but need not keep up horses ; they are called out for training only once in the four years (in the third year) for three weeks. The Cossacks of the reserve are bound to keep up the necessary arms and equipment in the event of being called out, but do no duty and have no training in peace time ; in time of war they are called out, as far as may be necessary, commencing with the youngest in age.

Supply of the Army with Officers and Under-Officers.

This question plays an important *rôle* in the organization of an army, as its moral and fighting qualities greatly depend on the quality of these classes.

In Russia there are three classes of training institutions :—

(*a.*) *Cadet Colleges :* for general elementary education and military subjects of the classes from which officers are drawn. There are 11 for infantry, 2 for cavalry and 3 for Cossacks.

(*b.*) *Military Colleges*, which are of a much more advanced kind and are generally recruited from those who have passed the courses of the cadet corps. There are 3 for infantry, 2 for cavalry, one for artillery and one for Engineers.

In addition to the above two cadet establishments, there are 20 cadet corps, which are preparatory schools, maintained by Government, for supplying (*a*) and (*b*) 3 in these the full course is 7 years ; also 7 military schools in which the preparatory course is 4 years.

(*c.*) *Military Academies* of which there are 4, *viz.* :—

Academy for General Staff.
Artillery Academy.
Engineer ,,
Academy of military justice.

Officers have to serve various periods before they can enter these establishments, and the courses are of $2\frac{1}{2}$ years.

In addition to the above there are—

Officers' Musketry School.
,, Cavalry School.
,, Artillery Practice School,
,, Galvanic Class.

Under-Officers.

In order to provide under-officers, by promotion from privates, there are two kinds of schools—

(*a.*) Company School.
(*b.*) Regimental ,,

All conscripts, on entering the service, are taught reading and writing in their company or squadron schools, and the course of instruction commences after the summer training and continues to the next summer's training. This instruction is carried out by the under-officers and better educated privates.

To prepare privates for duties requiring more education and also for the regimental school, a company school is established which is attended by at least 12 men per company, of whom two-thirds are young soldiers of the last draft who have had one summer training. The school is in charge of one of the junior officers assisted by the best educated under-officer. The course, reading, writing and arithmetic, is carried out between the summer trainings.

To prepare privates for under-officers, regimental schools are established. The number trained annually is equal to half the established strength of under-officers of the regiment. The men are selected by company commanders from amongst those of good character, capacity and possessing qualities suited to the position of under-officer from amongst those who have passed the course in the company schools ; they are, as far as possible, young soldiers, so that on promotion they may be retain-

ed as long as possible before passing to the reserve. The course is carried out between the summer trainings. A special officer (a company commander) is placed in charge, assisted by officers in an infantry and one in a cavalry regiment. A staff officer, one of the battalion commanders, has the general superintendence. They are examined in the spring by a board composed of battalion and company commanders under the presidency of the commander of the regiment.

On a vacancy occurring in a company the company commander selects a man who has passed the course in the regimental school and has served not less than two years. The appointment is confirmed by the regimental commander. The following cannot be promoted :—

(*a.*) Privates in the punishment class.
(*b.*) Privates reduced by court-martial from under-officers.
(*c.*) Privates reduced to the ranks from officers.

Privates can also be promoted for distinguished conduct in the field and also in peace time for an exploit, or for specially meritorious service.

Men whose period of service is limited on educational grounds can be promoted under-officers after reduced periods in the ranks, varying from three months to a year for conscripts of the various classes of limited service, and from two months to a year for volunteers ; they need not go through the regimental school but have to pass an examination.

Officers.

The rank of officer may be attained in different ways :—

(*a.*) Under-officers, who enter as conscripts, may be promoted to officers, but only after having served the full period according to the scale fixed by law for military service, and they must have served a certain time as under-officers ; 6-year men have to serve two years in that rank and 4-year men one year ; for under 4-year men there is no fixed period. They have to enter the cadet college when their period of service in the ranks has expired.

(*b.*) Volunteers before promotion must serve—

1st class ... 3 months ;
2nd ,, ... 6 ,,
3rd ,, ... 3 years ;

but they must have received one summer training. They enter the cadet or military colleges.

(*c.*) Pages of H. M. the Czar's Corps of Pages (4 classes) under various rules regarding the class of examination they pass.

(*d.*) Cadets of the cavalry and infantry military colleges enter as officers in three classes according to the examination they pass.

1st class as sub-lieutenants in the infantry of the line with one year's seniority, and from the cavalry colleges as cornets in the Guard or Line cavalry with one year's seniority.

2nd class as sub-lieutenants, or cornets in the Line.

3rd class as volunteers in the ranks as under-officers, and they are promoted officers in six months.

From the Michaelovski artillery college with two years' seniority in the artillery.

From the Nekolaevski Engineer College with two years' seniority in the Engineers.

Pay.

Officers are paid at two different rates known as "ordinary" and "increased" pay; the former is given in Russia proper, the latter, which is about half as much again, is allowed in the Caucasus and east of the Black Sea. In the Amur and Primorski districts and in Turkestan ordinary pay ranges from 687 roubles a year, for a colonel, to 294 roubles for a sub-lieutenant; increased pay from 1,032 to 441 roubles.* Two and a half per cent. is deducted from their pay for medical attendance and 6 per cent. for Pension Funds (Emerital cash). In addition to pay *table money* is given to officers *filling certain offices such as* colonel commanding a regiment, lieutenant-colonel commanding a detached battalion or regimental battalion, junior staff officers, company and squadron commanders, adjutants, paymasters, &c.

The amount varies from five roubles a day to three-fourths of a rouble.

All other officers, not entitled to table money, receive a special allowance of half a rouble a day.

Additional (command) allowance is also given to colonels of regiments, amounting to 1,200 roubles annually, and to commanders of detached battalions, varying from 300 to 900 roubles.

The pay of under-officers and privates is also "ordinary" and "increased," the latter being about double the former; it is given in the same manner as to officers, and also in war time anywhere without the limits of the empire.

There are some further allowances for officers, in the form of marching batta, field allowances, and there is working pay for the lower ranks.

Rations.

The Russian soldier receives rations and cooking money, the former consists of (about) 2¼lbs. (Russian)† flour or 3lbs. baked bread, or 2lbs. biscuit, ⅓lb. groats.

Cooking money is issued to permit of the men buying ½lb. meat, salt, vegetables and other stores; it is fixed annually for each Government depending on the local price of meat.

Supply of Forage.

The scale of forage for the various classes of horses is as under :—

		Oats. Russian lbs.	Hay. Rus. lbs.	Straw. Rus. lbs.
Guard cavalry	...	13½	10	4
Line „	...	10⅔	10	4
Draught horses	...	8⅔	20	...

In the Guard horses receive dry forage all the year round, in the Line, during 11 months, and officers receive forage for one horse.

* A rouble is 3*s.* 2*d.* nominal value.

† A Russian pound = ·903 lbs. Avoirdupois.

THE SIAMESE ARMY IN 1885.

By Major D. von Strantz.

Translated from the German by Sergeant J. J. Königs, B. U. L., *Librarian, Intelligence Branch of the Quarter-Master-General's Department in India.*

The organization of the Siamese army reminds one somewhat of the German Feudal times, the only difference being that in Siam the Feudatories have no power over the land but only over the people.

The inhabitants of Siam, and also those of the colonies inhabited by prisoners of war from Pegu and Burma, are divided into "krom," or departments, which are governed by high officials. The officials are required, when necessary, to provide free labour for Government works, such as canals, &c.

In case of war, the kroms are required to defend the country and the king. Each official has to raise recruits in his krom, in proportion to its size, and he himself, his sons and relations, have to lead these troops in the field. Formerly, a krom was divided into two sections—one for military duty and the other for labour, but this practice has been discontinued.

At Bangkok, there is a special department in charge of one of the highest officials, who has to keep a correct list of all the males in each krom eligible for military service.

It is said that in two days the Siamese army could be brought up to a strength of 200,000 men; these would of course be without any military training.

With the exception of the royal guard, the men of the different kroms undergo no military training in time of peace. In time of war, soldiers from the royal guard are detailed to train these troops.

Arms are supplied to them from the royal arsenal, in which 40,000 Snider rifles are said to be kept. There are, besides, in the arsenal, a variety of arms of European manufacture of obsolete patterns, the majority being flint locks.

During the raid by the Chien Hös tribe, large sums of money were expended on arms of very inferior quality.

The uniform issued to the militia is very plain, consisting of a red cotton jacket, short trousers, and cap.

The commanders of the different kroms on the frontier do not receive their orders direct from Bangkok, but through the Governors-General of their respective districts, who are vested with considerable authority. In cases of emergency they are authorized to raise troops and take the field without waiting for orders from the Government.

This is necessary owing to there being no means of rapid communication between the capital and the provinces on the frontier; but, in several

instances, the result has been that, while friendly negotiations were being carried on between the Governments of Burma and Siam, fighting was going on on the frontier.

In time of war about 3,000 elephants are impressed for service. These animals are very useful for purposes of transport in the jungle, but are worthless under fire.

A short time ago the Siamese army consisted of about 10,000 regulars (infantry and artillery).

These troops are drilled daily. In case of war, the king issues orders to the nobility, governors of provinces and of districts, to furnish contingents composed of their slaves.

Each soldier has to carry a month's provisions. Arms and clothing are provided by the Government.

The arms consist of muskets, pistols, daggers, two-edged swords, several kinds of lances, halberts, and swords. Some of the companies carry shields covered with raw hide.

The uniform is very plain. It consists of a hat made from rice straw or bamboo fibre, a waistcoat of red, blue, or green cloth, and short cotton trousers, which are worn very high up in the waist, and the colour of which varies according to the company to which the man belongs. The officers are permitted to wear a short silk coat, brocaded with gold. The commander-in-chief is expected to conform to certain superstitious customs, one of which requires him to wear on each day of the week a different-coloured suit; thus, on Sunday, he appears in white; on Monday, yellow; (Tuesday ?); on Wednesday, green; on Thursday, blue; on Friday, black; and on Saturday, violet.

Regiments composed of Christians wear European uniforms.

It is said that the commanders ars distinguished by names, such as "lion," "leopard," "tiger or garuda" (a mythical eagle), which are supposed to indicate their personal qualifications, and also with a view to instilling fear into the soldiers under their command.

The Generalissimo is called "Metah" (the mother of the army). It is the duty of an officer to cut off the head of any soldier who attempts to run away. A few years ago, a General, since deceased, used to carry a long lance, and on giving the command "Forward my children," he used to prick the soldiers to induce them to advance.

The time for the embarkation of an expedition is fixed by Brahmans, or court astrologers. They sprinkle the troops with holy water, and an effigy is erected which is supposed to represent the enemy against whom war has been declared. The executioner cuts off the head of this effigy, and it is considered a favorable omen if he succeeds in striking off the head at the first blow; on the other hand, it is considered a bad omen if more than one stroke is necessary. After the executioner has decapitated the effigy, the commander waves his sword, and the expedition starts amid shouts and the beating of gongs, &c.

The life of any person who attempted to cross the river before the troops would not be worth an hour's purchase; and in order to warn the inhabitants of the neighbourhood, messengers are sent on in advance to give notice of the approach of the troops, and to see that

all boats are kept moored at the banks of the river. It is said that when the troops were despatched on the expedition against the Chien Hös, a man was killed because he crossed before the troops; but this is indignantly denied by the Siamese Government.

The transport for guns and other material of war consists of elephants and bullock carts.

The colours are made of red cloth or silk, and have on them the figures of lions, dragons, and other mythical animals.

On the march officers are provided with elephants. Each soldier, while on the march, carries round his neck a piece of bamboo filled with water instead of a water bottle, and another piece of bamboo containing cooked rice dried in the sun. Towards evening, if possible, a halt is made close to a stream to enable the soldiers to take their customary baths; each soldier has to prepare his own meal. The Siamese soldiers are not put under canvas; they have to camp in the open, and fires are kept burning during the night to keep off wild animals; sentries are mounted, and it is their duty to strike the hours on the gongs. A countersign is given out to prevent misunderstandings. Should it be necessary to remain at one place for any length of time, a palisade is constructed round the camp, with small openings in it, and round this palisade a ditch is dug, outside of which another palisade of bamboos sharpened at the ends is erected. Although a camp thus fortified appears very strong, the fortifications are not strong enough to resist the charge of hundreds of elephants. Elephants are also employed for battering in the gates of cities, &c. If elephants are successful in their charge and penetrate into a city or camp, they pursue the inhabitants with great fury, seize them with their trunks, throw them into the air, and trample them to death when they fall to the ground.

The people are not overpleased when troops pass through their settlements, although they are the defenders of the country, because all eatables, fruit, poultry, and pigs, are appropriated by the soldiers without payment.

In important expeditions the king takes the command in person. It is said that in the great wars against Burma and Cochin China from 200,000 to 300,000 men, with some thousands of horses and elephants, were placed in the field.

In Paknam, which is the key of Bangkok and is situated at the mouth of the river Menam (or, to give it its full name, Chow Phya Menam),* up to the district of Paklat, further up the river, there exists an organization which resembles in some respects the old frontier service in Austria.

This organization consists of military colonies, whose duty it is to garrison the forts, and to defend them in time of war. The soldiers of this organization are not under the orders of the governors of the different kroms like their fellow countrymen, but are quite independent. To prevent them, however, from emigrating to other parts of the country and seeking employment elsewhere, they are branded, and are, so to speak, military slaves. Although these men do not wear uniform in time

* *Chow*—prince; *Phya*—chief. *Me*—mother; *Nam*—water.

of peace, some of them are taught gun drill daily, but the course of instruction does not include target practice. Besides their own officers, there are instructors, specially detailed from Bangkok, to train these troops.

In time of peace, considering the size of the country, a very small proportion of the regular army is clothed in uniform, and this is distinguished by the grand title of *The Guards*, but the general appearance of these troops is anything but creditable.

Each of the two kings has a special krom from which these "guards" are mostly recruited, but some of the recruits are drawn from the kroms of the high officials. The recruiting of troops is a remunerative business, as the officials, who are deputed to raise recruits, are bribed to excuse eligible young men from military service.

The uniforms are all copied from European patterns, especially the English pattern. Several English contractors have enriched themselves by providing uniforms for the Siamese army. The Chinese have, with their natural enterprise, undertaken to make these uniforms much cheaper, and have consequently almost driven the European competitors from the field.

Uniforms of European pattern are not generally suited to Orientals, and they are particularly unbecoming in the case of the Siamese soldiers, who are short of stature and look like children.

The Siamese speak of the old and new guard, but, as a matter of fact, the latter only is considered a part of the army. The old guard consists of men who belonged to the late king's guard, and who are now pensioned or employed as non-combatants. Seeing these men, clothed in blue jackets and armed with halberts and brass shields slung with red straps, posted as sentries at the different gates of the palace, one would hardly believe that they were a part of the guard.

This guard was in former times of considerable strength, but it is now almost extinct, and the few men who are kept as sentries for the palace are those who have found favor with the present king.

On festive occasions a portion of the old artillery turns out. These men are clothed in white helmets with red *pagris*, blue jackets, and *palays*. The *palay* is the Siamese substitute for trousers, and consists of a broad piece of cotton or silk wound round the loins; when properly put on, the *palay* resembles somewhat the knee-breeches of the time of Louis XIV.

The pieces of artillery are placed on tripods instead of on gun-carriages, and the flint locks, with which the men are armed, are of little, if any, use.

The men of the old guard appear in uniform only on special occasions, and drill was abandoned long ago. They have to thank some of the old officers for still being considered a part of the army.

The "*Tamruot*," or judicial department, is on a similar footing to the old guard, and dispenses summary justice. One of the high officials of this department, whose duty it is to be in constant attendance on the king, wears a uniform consisting of a light blue coat and *palay*, with a red sword-belt, and is armed with a sword, the scabbard of which is covered with red velvet, mounted with gold or precious stones, according to the

rank of the official. The magistrates, who are members of the *Tamruot*, march before the king on state occasions, as the Roman lictors use to do.

The Amazon guard, which is mentioned by some travellers, was abolished by the present king. These women formed the guard of the king's harem, and performed the duties entrusted to eunuchs in Mahomedan countries. On special occasions, they had to march alongside of the carriages of the ladies of the palace. Notwithstanding the Oriental character of this guard, they were clothed in European uniform.

The officers of the old and new guard look upon each other with great contempt.

The now guard, each branch of which is clothed in a different uniform, is, so to speak, the fashion plate of the Siamese army.

The royal body guards look better than the other troops, the men appear soldier-like, clean and smart, and have some self-respect, probably, because they are better paid than the rest of the army.

They are divided into two bodies :—

(*a.*) *The Foot Guards, numbering from 300 to 400 men.*—Their uniform consists of light blue tunics with yellow facings and white or yellow buttons, according to the company to which the men belong, blue trousers and white helmets. These soldiers are also provided with boots and socks, articles which are considered luxuries by the other branches of the service. The officers are distinguished by a *palay* with a border of gold, and a sash of white, red, and gold, which is worn from left to right.

This guard is ordinarily armed with Snider rifles, but the men who form the king's escort in expeditions, &c., carry Winchester rifles.

All the captains are aides-de-camp to the king, and wear as such dark blue frock coats, with gold cords. Their handsome uniforms add greatly to the splendour of the king's suite. One of these aides-de-camp is constantly in attendance on the king. On state occasions, when the king wears European clothes, he appears in the uniform of the foot guards.

(*b.*) *The horse guards, numbering about 30 men*, are not a successful imitation of their English namesakes. In their case, the uniform does not make the man ; they wear short red tunics of the English Life Guards pattern, with black piping, but instead of round buttons they have olivets ; blue breeches with a red stripe down the centre and two stripes of lace down each side ; and white helmets with red puggaris. They are armed with swords and Snider or Winchester rifles. These guardsmen are proud of their large horses, but the riders are not built in proportion to their mounts.

The country-bred horses, which are chiefly bred in the plains of *Korat* in the north-east of Siam, are of small size, like the Siamese themselves. The Siamese ponies are strong and well built. As regards symmetry these ponies are superior to the Tientsin ponies, which are of Mongolian breed.

The horse guards are employed as orderlies, and some of them are attached to the king's suite as pages.

Both the foot and horse guards are under the immediate command of the king.

This system was only introduced a few years ago, in the hope that it would make the men more attached to the sovereign, who issues his orders through a '*maul*' (mouth), only holding office for a few months. The guards are quartered in the palace, and are expected to be in readiness to carry out the king's orders.

In accordance with an ancient custom, the king has a silver bugle to enable him to summon assistance in case of danger. On this signal all the officers and men of the guard have to assemble round him.

The officers of the horse guards enjoy the special privilege of belonging to the *Mohet-Lek*, or *Corps d'élite*, which includes the personal staff of the king, and is composed only of princes and the sons of the highest officials.

Its members are privileged to have a daily interview with the king.

There is also a detachment of 600 men with Gatling guns stationed at the palace. This detachment is recruited from the krom of a prince, and is commanded by him. The uniform consists of a dark blue tunic with yellow facings, white buttons and white helmets.

Two detachments of about 600 men are quartered outside the palace. The uniform of these men consists of blue, red, and yellow tunics; and they are armed with Snider rifles.

The men of the infantry, who are employed on military and police duties in the city, do not present a very striking appearance, clothed, as they generally are, in torn cotton coats.

A fire brigade, which was organized a short time ago, consists of about 300 men, who look smart in their black trousers and black helmets; they are partly armed with Snider and Thompson's rifles. It is said that these men render good service on the occurrence of fire.

The new artillery consists of a detachment of about 400 men, armed with Armstrong breech-loading guns, and clothed in a uniform of dark blue tunics with red facings, white buttons, white trousers and white helmets, with horse-hair plumes. Their captain is the son of the Minister of War, and received a commission in the English Royal Artillery.

The cavalry consists of a small detachment, the men of which wear a kind of hussar uniform, and are armed with lances; these troopers are mounted on ponies.

The body guard of the second king, who are said to be the best drilled troops, wear a light blue tunic with yellow facings, and are armed with Snider rifles.

Instead of the uniforms described above, the majority of the Siamese soldiers, when off duty, wear white cotton clothing and a kind of service cap.

As the detachments of the different branches of the service are very small, they are commanded only by captains; in fact, there are very few officers of high rank in the Siamese army.

As has been already mentioned, the body guard consists of detachments raised from the king's krom and also from the kroms of certain high officials. The officers of the detachment recruited from the king's krom are appointed by the king himself; those of the other detachments are appointed by the Mandarins. The Minister of War appoints the officers of the new guard, and he therefore selects his relatives and friends.

Frequently, however, officers of high rank and good birth, who possess influence, endeavour to get these appointments for their own relatives.

In former times there was no War Department ; this was only recently established, and was copied from European nations.

The old system has however been very slightly altered, the department of war being of little practical use.

The title of War Minister was conferred on the Governor of the Western Provinces, but his duties remained almost the same as they were previous to the establishment of the War Department.

It is difficult to ascertain the exact strength of the standing army, owing to constant changes. The average may be taken as from 3,000 to 4,000 men, but on special occasions this number may be increased to 5,000 men.

The Siamese avoid speaking of the strength of their army, as, according to Oriental custom, it is considered unlimited. The details concerning the army are not even communicated to the king.

The pay is disbursed through the Minister of Finance. Only favourite corps receive their pay regularly; the others have to be satisfied with food and clothing and whatever they can earn while on leave.

Only 5,320 ticals* are paid weekly to the whole army, of this amount 1,820 ticals are paid to the body guard, the balance being given to the other troops.

The pay of a private soldier is from 6 to 10 ticals per month. The pay of the officers commences at 24 ticals per month, and in special cases rises up to 100 ticals per month, or even more. These officers generally cover their expenses by earning money privately, and they are enabled to do this by being privileged to take leave for long periods.

The discipline of the army is generally very lax, but this is not uncommon in Oriental armies which have to serve in a tropical climate. Offences are punished by flogging with rattans, and the punishment is generally so severe that frequently the person punished dies from the effects of the flogging.

Some of the branches of the service, and especially the men employed wholly on police duty, are never drilled. The other troops are drilled for an hour in the morning and an hour in the afternoon. The drill is English. Target practice is only performed by the officers, some of whom have become very good shots. Gun drill consists of the most primary evolutions, and target practice is never carried out. Gymnastics have not yet been introduced in the Siamese army. Route marching is not practised to accustom the soldiers to fatigue, only the king's escort, which has to accompany him on his tours, has to perform long marches. Manœuvres are only known to the Siamese officers by name.

The Siamese soldier only serves for six months during the year with the colours ; the other half of the year he spends with his family, and is engaged in his private business. Sometimes, however, he outstays his leave. Very often leave is granted after the first month's service, and of course the consequence of all this is that the training of the army is most imperfect.

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* 1 tical or bat=64 atts, average rate of exchange 2*s.* 1*d.*

The principal object is to make a good show at the court, and especially at grand festivals. Should a new white elephant enter Bangkok, or the king visit a temple in state, etc., the entire army parades with its bands. The bands consist of Annamese, who are taught by European bandmasters, and use European instruments. With their natural talent for music, the men soon learn to play, and the "Watch on the Rhine" is often heard at the palace and in the streets of Bangkok.

Almost all the troops are stationed in the capital. Two hundred men are on detachment at the island of *Paket* (Jong Cylon), near Penang. This island has some valuable tin mines, which are worked by Chinese labourers who require the constant supervision of the soldiers. The body guard of the chief commissioner of the North-Western frontier at Chienymai, consists of 70 men, whose duty it is to prevent the dacoits from committing raids on the British frontier.

The Siamese Government contemplates sending a commissioner, under military escort, to places bordering on the frontiers.

The majority of the men who form the garrison of Bangkok are housed. The barracks occupied by them are built to suit the climate, and are generally kept in good repair. They consist of one flat, divided into small rooms, and surrounded by a verandah. The best barracks are those occupied by the body guard, which are even furnished with beds and mosquito curtains. The other soldiers have to be satisfied with mats which are placed on the floor.

The officers of the body guard have a club, containing a billiard room and library. The sale of intoxicating liquors in this club was, a short time ago, prohibited by the king.

There are no forts of any strength in Siam. The old royal palaces and the so called "city" of Bangkok are surrounded by a wall; the residences of the Governors on the frontier also have walls. At Bangkok there are several forts, but they are not in good repair. The guns are rusty, and creepers cover the walls. The interiors of these forts are utilized as fruit gardens. The forts on both sides of the river at Paklat are not much better. The strong chain, which used, in former times, to be stretched across the river to prevent access to the city, was kept in these forts.

The Siamese take special care of the forts at Pakenam; one of these forts is situated on an island in the middle of the river, and is faced with stones and is kept in good repair. The fort on the left bank of the river is being extensively repaired, and new works are being constructed under the personal supervision of the second king; but the armament of these forts is bad, consisting, as it does, of old English guns of 1808, which are more or less unserviceable.

Similar repairs, it is said, will be carried out in the other forts in that part of the country.

Notwithstanding this, the Siamese do not hope to be able to resist a European invasion. They are afraid, however, owing to the immigration of large numbers of Chinese, that the Chinese Government may lay claim to a portion of Siamese territory; such claim they hope to be able to resist.

CAVALRY DISTANCE RIDES.

By Brigadier-General H. M. Bengough, C.B.,

Commanding Nagpore Force.

Introduction.

I have made the following extracts from the German "Militär Wochenblatt" of April 1884, describing some "Distance Rides" carried out by the Russian Cavalry, early in the same year, in the hope that we, a nation of horsemen, may be induced to practise in peace time such experimental exercises as may enable us to maintain in war that Cavalry pre-eminence which we are ready to accept as a national prerogative, but which may well be lost by over confidence and want of due training.

There is, I think, an innate prejudice amongst Englishmen against the practice of exercises in peace time as a preparation for war, and this is I think especially the case amongst English Cavalry Officers. Relying on the superior individual fitness for warfare of Englishmen and horses, we are apt to ignore the necessity for special training, and trust to the experiences of the field to teach the lessons which other nations assiduously cultivate in manœuvres and experimental practices in peace time.

Thus, in this instance no doubt, Cavalry Officers may object to "knocking their horses about" by practising such Distance Rides, as are herein described, and will point to the feats performed by our Cavalry, under leaders like Lord Lake, General Gilbert, Colonel Barrow, and others, as examples of what British Cavalry can do when required. But putting aside the point that leaders such as these are not always to be found when wanted, it is surely well for an Officer to know from personal experience, what his horses can and cannot do. Such knowledge applied at the critical moment might be invaluable.

I would urge then that Officers Commanding Cavalry Regiments, and, better still, General Officers Commanding Divisions comprising a Cavalry Brigade, might carry out such experimental Cavalry and Horse Artillery rides, in small parties, and also in considerable bodies. The Rides might well be combined with some tactical idea, the results should be carefully recorded, and the observations and experiences reported to Head-Quarters for the benefit of the service.

H. M. BENGOUGH, *Colonel*,
Assistant Adjutant-General,
Bangalore Division.

Bangalore, 14th *July*, 1886.

CAVALRY DISTANCE RIDES.

"Distance ride of Officers of the Cavalry School of Krasnoje, near St. Petersburg.

"Under the orders of the Commander of the Officer's Cavalry School, a detachment of 10 Officers and 9 men, with 24 horses (19 under saddle, 3 hand led, and 2 pack horses), undertook a distance ride.

"A tactical idea was given by which the detachment was to ride from Krasnoje to Vruda, Rojhestveno, Tossna, Pawlovsk by Sofia, to the barracks of the Officer's Cavalry School at Zarskoje. The distance on the map is 149 miles (English).

"It was arranged some days previously where and for how long the halts for the night should be made, where the halts on the march both long and short should come in, how the pace should be regulated, and how the care of men and horses should be carried out.

"The detachment rode on the bit, and with stirrups a little shortened.

"Left Krasnoje at 5 A. M. on 31st July.

"Arrived at Volyovo, 21 miles, at 8-45 A M., ¾ hour halt.

"Arrived at Vruda, 20 miles, at 12-30 P.M., 2 hours halt.

"Arrived at Kalitino, 16 miles, at 5 P.M., half hour halt.

"Arrived at Rojhestveno, 15 miles, at 8-30 P.M., halt for the night.

"On 1st August the detachment started at 2-30 A.M.

"Arrived at Gorki, 21 miles, at 7-25 A.M., 35 minutes halt.

"Arrived at Tossna, 19 miles, at 11-30 A.M., 3 hours halt.

"Arrived at Pawlovsk, 20 miles, at 6 P.M., half hour halt.

"Arrived in barracks, 17 miles, at 9-30 P.M.

"The horses were so fresh at Rojhestveno, after a ride of 57 miles in 15½ hours, that, in spite of a halt of only 6 hours, they eat besides hay from 3 to 4½ measures of oats.

"The 149 miles were accomplished in 40½ hours, of which 27½ hours of actual marching, so that the average rate was about 5½ miles an hour.

"Both the Officers and men bore the ride remarkably well, retaining their strength and energy.

"Of the 24 horses one only, that was lamed by a bruise, was brought back from Rojhestveno to Krasnoje; the remainder kept well and sound throughout, in spite of the obstacles from traffic on the roads, which were mostly main routes of communication. It should be mentioned, that by way of experiment, some light boned horses were taken, and that these also bore the ride well.

"As regards pace, it was found that the most suitable was to walk for 10 minutes, at the rate of about 4 miles an hour, and trot for 15 minutes, at the rate of 7½ miles an hour. In the latter part of a march, the trot can be quickened to about 9 miles an hour. The main halts should be for not less than 3 hours, to allow of feeding properly."

The following is an extract from the same journal :—

"Distance Ride of 2 Sotnias* of the 15th Cossack Regiment of the Don Cossack Division.

"On 10th January, 1884, a telegraphic order was received from Warsaw for two named Sotnias, to be made up to a strength of 9 files per section, and to march on 11th on Sawischoft, to cross the Vistula, and proceed as far as Tschenstochan, a distance of about 217 miles (English), arriving there at daybreak on 14th January.

"They were to take not more than 8 led horses per Sotnia, 4 Blacksmiths, 2 Surgeons and 2 Veterinary Surgeons ; and instead of the usual transport train, were to take 2 pack-horses per Sotnia, to carry the tools for destroying telegraphs and railways.

"The Sotnias were to be opposed on the Vistula by a detachment of 14th Cavalry Division.

"The command of the detachment devolved on Colonel Denissov, Commanding 10th Regiment ; General Tschernosubov, Commanding 2nd Brigade, and Colonel Golubinzev, Commanding 15th Regiment, officiated as Umpires. Colonel Baikov, Chief of the Staff of the Cossack Division, and Captain Karzev of the General Staff accompanied the detachment.

"The horses were at once shod behind, and the men furnished with spare shoes.

"The Sotnias marched from their quarters at Samostje and Tomaschov early on the morning of the 11th January. The detachment was to concentrate at Janow. The road was, for one of the Sotnias, half level and half hilly, for the other, level and through forests ; the distance amounted to 41½ miles and 51 miles respectively. At 4-30 P.M. precisely both Sotnias reached Janow and the detachment was concentrated.

"After a halt of 3 hours, during which the horses and men were fed, the detachment started for the Vistula. The road was covered with snow and ice, and it also rained ; the march during the night was made on a regular ice track, on which the water stood, and through rain and a cutting wind.

"At 3 A.M., on 12th January, Annopol was reached ; the Vistula was closed ; to cross it was impossible. The detachment turned southwards, and after reconnoitring the pass of Josephov, marched on Warsaw. There was no snow along the banks of the Vistula ; a complete thaw had set in, and the mud was over the fetlocks.

"After a march of 43 miles, over hill and dale, through very stormy weather, quarters for the night were found at Novo-Alexandria. On 13th January the river Veper was crossed at Fort Ivangorod in a ferry boat, which only held 14 horses, and the march continued on the Warsaw high road, which was covered with ice in the middle, and very rough on the sides. A halt was made at Garvolino. At 3 A.M., 14th January, at from 10 to 12 miles from Warsaw, the detachment was met by 3 squadrons of the Hussars of the Guard and Uhlans, and a Sotnia of the Kuban Cossacks. These retreated after an attempt to check the detachment of Don Cossacks.

*A Sotnia of Russian Cavalry=100 men.

"The two Sotnias of the Don Cossack Division entered Warsaw on the morning of the 14th January, after a march of 80 miles without night quarters.

"Altogether the detachment had accomplished over 210 miles in 72 hours, and under the most unfavorable circumstances of road and weather.

"Immediately on arrival, the Sotnias were inspected by General Adjutant Gurko, Commanding the troops at Warsaw; they marched past and attacked by Zugs (sections). The General was completely satisfied with the appearance of the men and the freshness of the horses. The strength of the Sotnias still amounted to six or seven files per section. Some 16 to 20 men of each Sotnia, who had been left behind at the last halt, came in at midday.

"These exercises are considered of much value in Russia, and with reason. They are undoubtedly a means of education for war. As a consequence, opinions have already been evoked of the desirability of regulations for the conduct of Distance Rides.

"The above examples, extracted from various Russian Military publications, show clearly both the education of Russian Cavalry and the object aimed at in its training. Further commentary is unnecessary.

"Should it be supposed, from the transformation of the Russian Hussars and Uhlans into Dragoons, that the real Cavalry element would be put in the background, and their Cavalry become a mounted Infantry, the exercises of the year 1883 do not support this supposition.

"The Russian Cavalry is, it is true, divided into branches, which other armies think may be dispensed with. The Russian War Minister is, however, by the nature of the country itself, compelled to adopt a period of service for Cavalry soldiers of six years, and this gives sufficient time to devote special attention to fighting dismounted, and to pioneer duties, without injury to the essential Cavalry element of the arm."

The above is, it will be observed, the opinion of the leading German Military Journal.

The following examples of good Cavalry marches may be of interest:—

On 16th November, 1804, Lord Lake's Cavalry, when pursuing Holkar, marched 70 miles in 24 hours, of which 36 miles during the night, and this after a long and harassing succession of marches amounting to 350 miles in about 15 days.

The Guide Corps in 1857 made a forced march in 22 days from Peshawur to Delhi, 580 miles, at the hottest season of the year.

General Stewart's Cavalry of the Confederate Army, composed of 1,800 horsemen and 4 guns, in October 1862, marched from Chambersburg to Leesburg, some 90 miles in 36 hours, and in 1883 General Morgan marched from Summansville (Indiana) to Williamsburg to the east of Cincinnati, a distance of 90 miles in 35 hours. His usual pace was a walk at the rate of about 4 miles an hour, and as he often marched 15 or 16 hours out of the 24, he was able to cover in this way from 60 to 70 miles a day. General Morgan's Cavalry carried nothing

but the rider, his arms, ammunition (100 cartridges), saddle, bridle and a blanket.

General Sir Drury Lowe's Cavalry Brigade, in Egypt, marched from Kassassin to Belbeis on 13th September, 1882, 22 miles, and from Belbeis to Cairo, 36 miles, on the following day.

At the Russian Camp of Instruction at Krasno Selo, in 1883, a Cavalry reconnaissance of 2 stations on the Nicholai and Warsaw railways was made by 8 squadrons and 8 guns, a similar force being sent from Camp to attack the reconnoitring force. The troops returned to Camp the following day. The distances covered out and back to Camp were from 75 to 80 miles, to which at least 10 miles must be added for patrolling, flanking and outpost duties.

Men and horses, both of the Cavalry and Artillery, performed their work efficiently, and returned to Camp in satisfactory condition. The men carried oats and rations with them; hay and wood were brought *en route*.

During the time the above has been in Press, a sub-division of M/B R. H. A. at this station has performed the following good Distance March, amounting to 181 miles in 64 hours. The conception of this march originated with Captain W. J. Robertson, then in Command of the Battery.

The party consisted of 6 draught horses with 2 spare horses, and 6 detachment horses, with 1 Officer, 1 Non-Commissioned Officer, 6 Gunners and 4 Drivers. The carriage was an ordinary 9-pr. M. L. R. Gun of 6 cwt. carriage and Limber.

The horses were not specially selected for the work, but received 12 days' preparation in training and feeding.

The marches were made out from Cantonments and back, according to the subjoined table.

Date.	Hour of Starting.	Miles out from Bangalore.	Miles from last Halt.	No. of Hours work.	Remarks.
1886.	5 A.M.				
20th July ...	.....	8 miles...	8 miles	...	Halted 10 minutes, and watered.
,, ...	.....	17½ ,, ...	9½ ,,	...	Halted 40 minutes, fed and watered.
,, ...	.....	26 ,, ...	8½ ,,	...	Halted 10 minutes, and watered.
,, ...	Noon ...	35 ,, ...	9 ,,	7	Halted 2½ hours, fed and watered.
,, ...	2-30 P.M. ...	43 ,, ...	8 ,,	...	Halted 10 minutes, and watered.
,, ...	4-30 P.M. ...	47 ,, ...	4 ,,	...	Halted 40 minutes, fed and watered.
,, ...	.....	56 ,, ...	9 ,,	...	Halted 10 minutes, and watered.
,, ...	8 P.M. ...	65 ,, ...	9 ,,	13	Halted 9 hours, fed and watered. (65 miles in 13 hours.)

DATE.	Hour of Starting.	Miles out from Bangalore.	Miles from last Halt.	No. of Hours work.	REMARKS.
1886.					
21st July ...	5 A.M. ...	74 miles ..	9 miles	...	Halted 10 minutes, and watered.
,, ...	8-15 P.M. ...	83 ,, ...	9 ,,	27¼	Halted 40 minutes, fed and watered. (82 miles in 27 hours.)
,, ...	.....	89 ,, ...	6 ,,	...	Halted 10 minutes, and watered.
,, ...	1-15 P.M. ...	95 ,, ...	6 ,,	32	Halted 2 hours, fed and watered. (94 miles in 32 hours.)
,, ...	3 P.M. ...	103 ,, ...	8 ,,	...	Halted 10 minutes, and watered.
,, ...	.....	111 ,, ...	8 ,,	...	Halted 40 minutes, fed and watered.
,, ...	.....	119 ,, ...	8 ,,	...	Halted 10 minutes, and watered.
,, ...	9 P.M. ...	125 ,, ...	6 ,,	...	Halted 8 hours, fed and watered. (125 miles in 40 hours)
22nd July...	5 A.M. ...	133 ,, ...	8 ,,	...	Halted 10 minutes, and watered.
,, ...	.....	141 ,, ...	8 ,,	...	Halted 40 minutes, fed and watered.
,, ...	.....	149 ,, ...	8 ,,	...	Halted 10 minutes, and watered.
,, ...	Noon ...	156 ,, ...	7 ,,	56	Halted 3 hours, fed and watered. (156 miles in 56 hours.)
,, ...	3 P.M. ...	163 ,, ...	7 ,,	...	Halted 10 minutes, and watered.
,, ...	.....	173 ,, ...	10 ,,	...	Halted 40 minutes, fed and watered.
,, ...	9 P.M. ...	181 ,, ...	8	64	Halted 9 hours, fed and watered. (181 miles in 64 hours.)

The sub-division marched 18 miles on the morning of 23rd July in 4 hours, as a test march. The horses, though somewhat leg weary, were in perfectly serviceable condition. The detachment horses were occasionally hooked in during the several marches and the draught horses changed.

The favorable conditions were : comfortable night quarters, assistance in looking after the horses and harness, plenty of good food and water, good roads, and fair weather.

The table of preparation, work and feeding, is as under :—

Table of Work and Food.

Date.	Work done.	Food.				
	Practice Work.	Coolty lbs.	Chenna lbs.	Hay lbs.	Grass lbs.	
8th July	12 miles ...	10	2	...	40	In draught.
9th ,,	15 ,, ...	10	2	...	40	,, ,,
10th ,,	20 ,, ...	10	4	...	60	,, ,,
11th ,,	2 hours walking exercise ...	10	4	...	60	,, ,,
12th ,,	25 miles ...	10	4	...	60	,, ,,
13th ,,	28 ,, ...	10	4	...	60	,, ,,
14th ,,	44 ,, ...	10	6	20	30	22 miles without gun.
15th ,,	Exercise 2 hours ...	10	6	20	30	
16th ,,	42 miles ...	10	6	20	30	In draught.
17th ,,	20 ,, ...	10	6	25	20	,, ,,
18th ,,	Exercise 2 hours ...	10	6	25	20	
19th ,,	20 miles ...	10	8	25	20	,, ,,

The following good individual rides may be noted :—

Lt.-General Sir Samuel Brown, K.C.B, V.C., when Commanding the "Guides," rode on relays of horses from Rajanpur to Hoti Murdan and back in 10 days, or an average of 100 miles a day.

Colonel J. H. Green, 12th Bengal Cavalry, in 1878, rode a horse from Jhelam to Pindi and back, 140 miles, within 36 hours. The horse was a thorough-bred entire Waler, about 15 hands, and was put through a preparatory training of six weeks. The horse was in no way distressed by the journey, and was, his owner assured me, quite equal to repeating the ride the next day.

H. M. BENGOUGH,
Colonel,
Asst. Adjt. General.

Bangalore, 17*th August*, 1886.

APPENDIX.

The following account of a good Cavalry Exercise carried out by the 4th Russian Cavalry Division is translated from the French Military Journal "Revue Militaire de L'Etranger" for June last, which reached this station by the last mail, and should prove of interest :—

"We propose to satisfy the legitimate curiosity of all those who take an active interest in the training of Cavalry for the part that they will have to play in future wars, by offering our readers an account of a Distance Ride executed by certain Detachments of the Division of General Stroukov in the beginning of May last, in execution of the instructions contained in Order No. 1 of Grand Duke Nicholas, Inspector-General of Cavalry.

"Under the orders of the General, the 4 regiments of the division had to furnish each a Detachment, averaging from 25 to 30 men, with Officers, having as an objective to seize the bridge over the river Stchar, near the town of Slonim.

"This operation represented for the Detachment of the 10th Dragoons of Ekaterinoslav a march of 218 miles (English), to be accomplished in 4 days, for the 4th Dragoons at Kharkov, a march of 255 miles in 5 days, for the 12th Dragoons at Marioupol, a march of 188 miles in 3 days, and for the regiment of Cossacks of the Don, one of 190 miles in 3 days, or a march averaging for the first detachment, 54 miles in 24 hours, for the second 51 miles, for the third 62 miles, and for the Cossacks 63 miles.

"The Detachment of the regiment of Ekaterinoslav, composed of 25 troopers and 7 Officers, left Bielostok at 9 A.M. on 7th May for Slonim. It had a distance of about 108 miles to traverse without night quarters, making only some long halts. General Stroukov accompanied it. The distance was accomplished as under :—

	h.	m.		h.	m.
21 miles in	2	45.	Halt for	1	20.
21 miles in	2	45.	Halt for	1	hour.

22 miles in 4 hours, night march by lantern light. Halt for 4 hours.

16 miles. Halt for 2hrs. 30mins.

28 miles. Arrived at Slonim at 6 P.M. Before entering Slonim the Detachment was ordered to gallop by General Stroukov, and the horses did not appear fatigued.

"Almost the entire march was made at a slow trot ; the walk was only used at ascents and at soft parts of the route ; the men only dismounted when the inclines were very steep. The weather was particularly unfavorable, for it rained incessantly, making the march very irksome, especially at night ; however, thanks to the energy of the General and the influence exercised by him on the men, the operation succeeded admirably, and was carried out with an excellent spirit. The detachment of the Ekaterinoslov regiment accomplished, as shown above, 108 miles in 33 hours, of which 16½ hours on the march, and the same at rest, representing an average pace of 6½ miles an hour.

"After passing the night at Slonim, the return march to Bielostok was commenced at 11 A.M. The distance was accomplished as under :—

27 miles. Halt for 4 hours.

16 miles. Halt for 7 hours.

44 miles. Halt for 5 hours.

21 miles. Arrived at Bielostok at 9 P.M., 10th May. The 108 miles were accomplished in 34 hours, of which 16 hours were used for rest, not including short halts, and 18 on the march, representing also a pace of 6½ miles an hour, or to sum up the total distance of 216 miles was accomplished in 77 hours, of which 34½ hours were devoted to the march.

"The horses of which the Detachment was composed were taken generally from those the least trained, the least used to the ranks,

from those, in short, which represent an incumbrance to squadron commanders. In this forced march they behaved excellently, none fell out or showed signs of exceptional fatigue. They had been previously trained for 3 weeks, doing 50 odd miles daily.

"The halts were long. This was so arranged, as it was remarked, that the horses would not generally commence to feed properly until some two hours after halting. Before that time they only played with their hay and oats, and it was only after being rested that they fed, some eating as much as 23 quarterns (litres) of oats, and the others never less than 13 quarterns. On the march to Slonim they consumed more hay than oats, on the return march this was reversed. As regards water they drank plentifully, especially after the first 20 or 30 miles, but very moderately during the rest of the journey.

"At the long halts almost all the horses, even those of the strongest build, lay down for half an hour, and then got up of themselves. It was remarked that generally the second day of the march was the most felt, so that horses whose strength could be nursed for that day, could certainly march much further. In spite of the rain none of the horses were galled. This result must be attributed, said the Russian Officer, from whom we have borrowed the account of this march, which has lately been published in the "Invalide Russe," as much to the care taken in saddling as to the fact that the men of the 4th Cavalry Division are trained to rise in their stirrups at the trot, which is less fatiguing to both horse and rider. After the first 20 miles the bits were removed. One horse only lost a shoe, which was however replaced in ten minutes on the spot by a Farrier that accompanied the Detachment.

"As to the men, they marched capitally throughout, although it was easy to see at the rests that they were very fatigued. They slept where they could without thinking of their comfort. There were no excoriations. As it was impossible to procure a hot meal for them everywhere, they were given a small ration of brandy.

"The Distance Ride of the 4th Cavalry Division will certainly be followed by similar exercises by other Corps, in accordance with the orders of the Grand Duke Nicholas. We shall accordingly have occasion to return to this subject, and we shall communicate to our readers the information we may obtain regarding these exercises, to which the Russian Cavalry attach the greatest interest."

I cannot conclude this little pamphlet better than by quoting the last published words of that brilliant and accomplished Cavalry Officer, the late Captain Nolan, 15th Hussars, when referring to some experimental forced marches made under the orders of General Sir George Berkeley, formerly Commander-in-Chief of the Madras Army :—

"The excellent example set by Sir George Berkeley in India might be followed up at home with great advantage to the service ; the capabilities of our Cavalry horses of the present day should be severely tested, and the saddles should be tried, and experiments made to ascertain how sore backs may be avoided."

BANGALORE, *27th August*, 1886.

SOME REMARKS ON THE SUPPLY OF ARTILLERY AMMUNITION IN ACTION.

By Major James Fox-Brough, K.B., R.H.A.

The above appears to be one of the points which deserves attention at present.

Captain Grierson, in a recent number of the Journal of the R. A. Institution, states, with reference to the German armies, that, "in 1870, on the march, every gun was followed by its ammunition waggon, the remaining waggons marching at the tail of the battery. On going into action two échelons were formed. The first, consisting of three ammunition and one store waggon, followed the guns closely everywhere. The second échelons, comprising the remaining waggons, were massed by Brigade Divisions, and moved by order of the Divisional Commanders. On the battery taking position, the first échelon ammunition waggons were placed between the guns of the division to which they belonged, in the same line with them, and at the ordinary interval, and the rule was to empty the waggon first, leaving the gun-limber supply untouched as long as possible."

The method of the British Service is to use the ammunition in the gun-limbers and replace it from the waggons. What the Field Artillery Manual lays down is:—

"When a battery takes up a position for action, the waggons, spare men and horses, should be drawn up in charge of the captain, about 200 yards in the rear of the least exposed flank of the battery, in any formation which may be best suited to take every advantage of cover afforded by the nature of the ground. The distance of 200 yards is merely laid down as a convenient distance for drill purposes; the great object of the officer in charge of waggons should be to keep them *out of fire and yet within easy reach* of the guns, so as to act as an immediate reserve. If, therefore, good cover can be obtained from 100 to 500 yards from the guns, he should avail himself of it."

To replace the ammunition in the gun-limbers, one waggon per division is sent forward, reversed in rear of the interval between its guns, and the ammunition transferred from the waggon body boxes to the gun-limbers, thus leaving the waggon-limbers full. The order, however, permits that: "Under pressing circumstances, when a speedy completion of the ammunition is necessary, the limbers of the ammunition waggons may, on their arrival at the guns, be exchanged for those of the gun-limbers."

The two systems are, therefore, different. The question is, which is the best? The Germans, by their system, expose three waggons per battery in their fighting line, and they increase the frontage required for a battery by three ordinary intervals, or very little under 60 yards. The next point that attracts attention is, why, if it is only necessary to preserve the ammunition in the gun-limbers from being used, bring up *three* waggons? Two waggons, *i.e.*, one per half-battery, would be sufficient to prevent the gun-limber ammunition being touched; and by placing these two in rear of the centre of each half-battery, and

reversing them there, the distance to be travelled by the gun-limbers bringing up the ammunition would not be excessive, and the frontage of the battery would not be increased. If, therefore, there is a tendency to adopt the German system, this point seems worthy of consideration. Also, if but three waggons accompany each battery into the fighting line, why oblige each gun to be followed by its ammunition waggon on the march? Therefore, again, the question arises, if we adopt the German idea as to keeping the ammunition in the gun-limbers intact, why not limit our first échelon to two waggons per battery and march the remaining waggons by brigade divisions in rear of the troops the artillery is acting with, as is done at present with all the waggons?

As far as I can see, there are four methods of supplying ammunition to batteries in action to choose from :—

(1.) By transferring the ammunition according to the method above quoted from the Field Artillery Manual, from the waggon body boxes to the gun-limbers—our ordinary method.

(2.) By exchanging the gun-limbers for those of the waggons—permitted under pressing circumstances.

(3.) By bringing successive échelons of waggons into the fighting line—a system not recognized by us as yet.

(4.) By multiplying the number of boxes, *i.e.*, instead of each large, heavy and clumsy ammunition box of the present equipment, substitute two or three boxes of iron-plating, which could carry as many rounds as the present boxes, and occupy no more space. If for each of the present ammunition boxes three of iron-plating could be devised, surely it would be easy enough to transfer these boxes from the waggon bodies to the gun-limbers, and thus obviate the delay of unpacking from one lot and repacking in the other?

Even if we adopt the German system, and determine that a proportion of waggons are to accompany each battery into action, circumstances might arise during an engagement which would oblige the ammunition in the gun-limbers to be used either partially or wholly, when the possibility of transferring a fresh supply to them by boxes, instead of round by round by hand, should lessen the chances of casualties.

As regards the number of waggons which should follow with each battery *on the march* to battle, it would surely prevent confusion to limit the number to whatever be decided on for the first échelon. To permit each gun to be accompanied by its waggon on the march, and then, on reaching the scene of action, to eliminate the second échelon waggons, might tend to confusion and possibly waste of time. Also, by marching more waggons with each battery than it would require as its first échelon, would occupy space which might, one would humbly think, be better occupied by troops. Therefore, as above suggested, why not let the second échelon waggons of *all* the batteries marching together be massed in rear of the column of troops? And, similarly, for the Corps Artillery, why not limit the waggons with each of its batteries to those of their first échelon, and march those of the second échelon in rear of the rear battery?

RAWAL PINDI, *1st January*, 1887.

HINTS ON MILITARY LANDSCAPE SKETCHING.

By Major L. F. Brown, R.E.

In military operations an accurate freehand sketch of country taken from some commanding point is often quite as useful as a rough plan, whilst at the same time it conveys an idea of the character of the country reported on, which the best survey would never do.

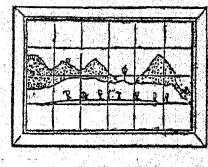
As far as I know, no system of making an *accurate* sketch has ever been taught in the army; and as accuracy is of the highest importance in all military reports, I propose to give a short description of a system which I have frequently put in practice myself.

Many officers can sketch quite sufficiently well to draw a tolerably accurate outline of a house, a village, a bridge, or small portion of a hill, but fail in combining the whole view which lies before them into a landscape drawing.

To such, perhaps, this system will commend itself, so that by the gradual training of the eye into proper ideas of proportion, the habit of correct drawing will become instinctive.

Science is measurement; but how can a view of open country be measured? Yet if it could be measured in the same way as a plan or picture can be measured, nothing would be easier than to reproduce any landscape.

Every view can be conceived to be a view seen through a picture frame, and if we could stretch strings or wires across the picture frame corresponding with lines drawn on our paper, we could reproduce the scene before us, square for square, exactly as in copying a plan. The eye, though in reproducing a view on this principle, must be always applied exactly in the same spot, otherwise the wires would appear to move over the view beyond. This difficulty might be overcome by viewing the landscape beyond through a small fixed peephole placed at the proper distance in front of the picture frame, and it would be easy to design a portable apparatus constructed on this principle by which a landscape might be exactly measured. Every officer though now-a-days has or can borrow a prismatic compass. I will show how this can be made available for landscape sketching, and beg the reader to refer now to the specimen sketch.



The eye takes in at one view from 40 to 60 degrees; set up therefore the prismatic compass (on a stand if you have one) and see how many degrees your view will embrace. In this case it is from 171° to 229°.

Draw vertical lines on your paper representing the compass hair at every ten degrees, leaving intermediate degrees to be judged by the eye,

or a small scale may be drawn on paper to help to fix the units of degrees.

In this case each degree is represented by $\frac{1}{8}$th-inch and each ten degrees by $\frac{5}{4}$th-inch.

Draw a line H H horizontally across the paper to represent the horizon.

Now take bearings to the most distant outline of your view, selecting any prominent points or features. Here we have selected 172°, 177°, 189°, 195°, 201°, 214°, 218°, 221°. Set these off on the paper. It is easy to get the heights correctly ; for instance 218° is the highest point, 177° considerably lower, and 195° lower than that again.

If the slopes of any one of these hills, say 195°, are drawn correctly, it will be hardly possible to make a mistake in the height of the other hills.

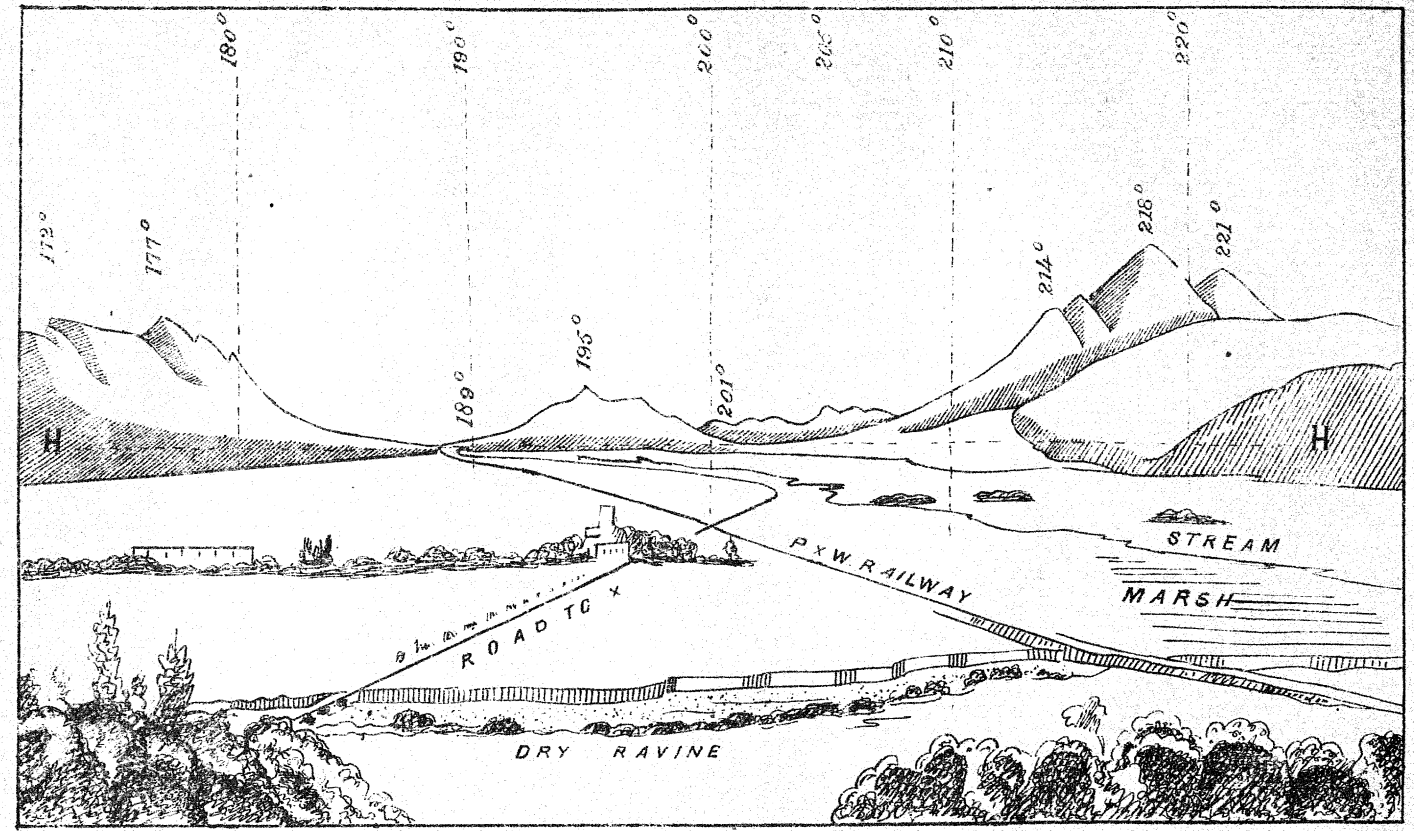
Having drawn the distant outline correctly, this becomes a scale for the rest of the picture.

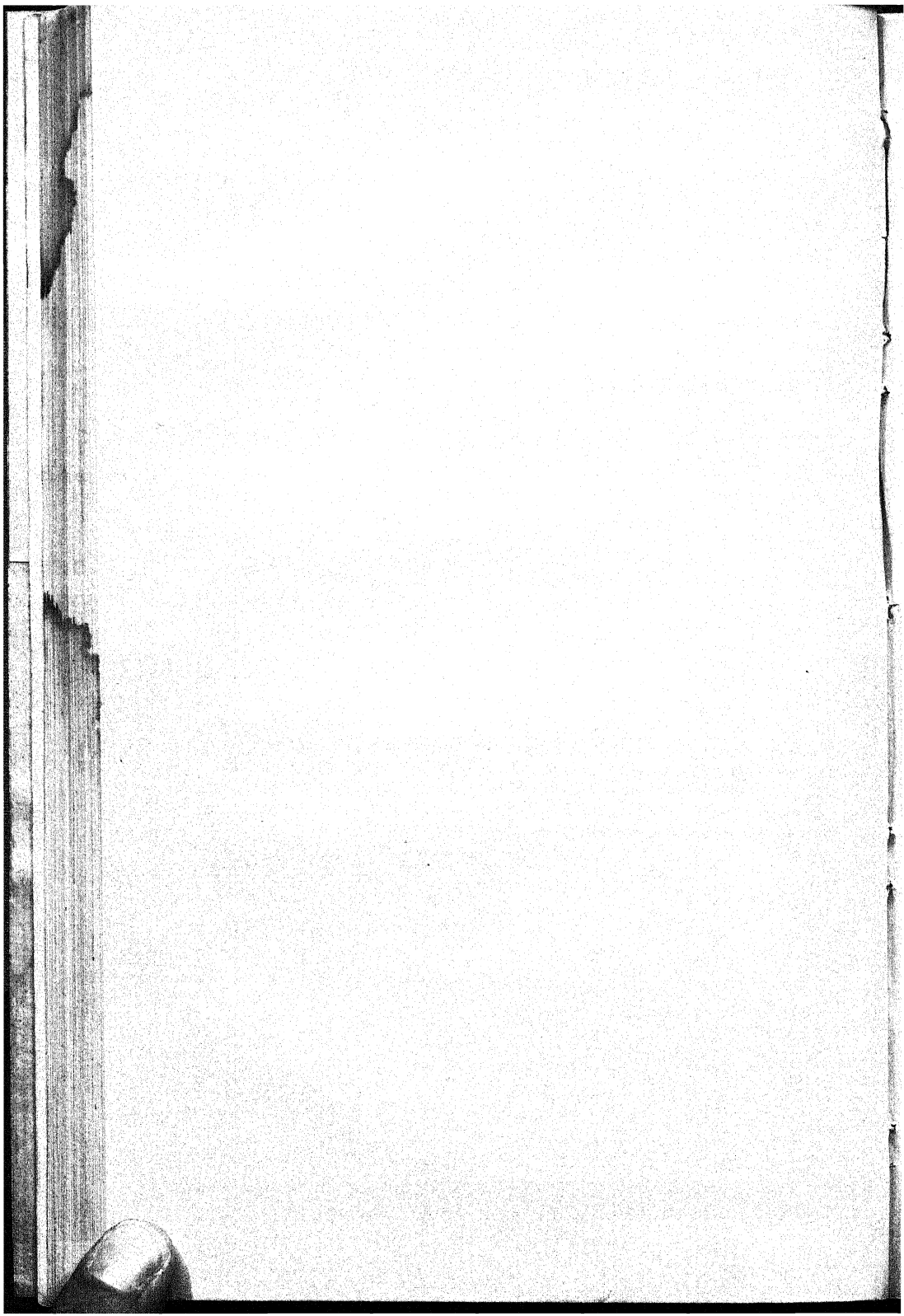
For instance, the tower is a little to the right of peak 195°, and its top is the height of that hill below the horizon. The long building to the left comes under the peak 177°. The bridge over the dry ravine on road to × comes obliquely under this, and the railway bridge comes under the peak 214°, but a little higher in the picture. Measure as many prominent points as you like in the above manner, and the rest of the picture will then begin to fit in like a puzzle.

For instance, the railway line runs straight from its bridge to the gap 189°. The road runs from the bridge to a point under the tower ; it then curves a little beyond the hollow 201°, and finally runs to the gap 189°. The stream just clears the road at its upper end, and so on.

The sketch can now be finished up with printed explanations, according as the text books teach you, or according to the particular object which your sketch is intended to explain ; and in a military drawing it will often be correct to give prominence to certain important objects, which, by reason of bad light or partial concealment, do not readily catch the eye when casually viewing the scene. In this way a good military sketch may be actually better for the purpose for which it is required than the best photograph.

In this paper I do not give any artistic hints, as these can be learnt from books, from the study of nature, and from practice.


172°
177°
180°
189°
195°
199°
201°
214°
216°
221°
H
H
STREAM
MARSH
P x W. RAILWAY
ROAD TO X
DRY RAVINE



The two following Articles are extracted from the *Journal of the Military Service Institution* of the United States of America.

SMALL-ARMS AMMUNITION SUPPLY.

By First-Lieut. George S. Wilson, *Twelfth Infantry.*

The problem of ammunition supply to meet the heavy demands of breech-loading arms has received a great deal of attention in all European armies. Means of insuring the supply to the army, and of handling cartridges, from the time they leave the depôts until fired at the enemy, have been worked out in detail and embodied in regulations. The commander, from the company to the head of the army, understands in advance what will be furnished and the action necessary on his part to supply his men with cartridges.

With us it would appear that the subject has been neglected. Breech-loading arms have been in our hands well on to twenty years. All military men recognize the fact that the successful use of this arm depends upon means of supplying ammunition in quantities far excelling any former experience of ours, yet should war come to-morrow there would not be a commander, high or low, who could refer to a regulation, or official suggestion, governing either the quantity, the transport, or the handling of our cartridges.

The question thus being an open one, I will present for consideration a hasty review of the different systems of ammunition supply in armies where the subject has received that attention which its importance deserves; and at the same time I will offer a few suggestions applicable to our own service.

For convenience of discussion the subject may be treated under three heads:—

First.—The total supply.

Second.—The wagon transport.

Third.—Service of cartridges to the fighting line, and the quantity carried by the soldier.

In a paper entitled "The Supply of Ammunition to Infantry on

the Field of Battle," written by an officer of the French army, and republished in our "Ordnance Notes,"* is this table :—

Manner in which the ammunition is carried.	No. of cartridges carried by enlisted men.						Remarks.
	France.	Germany.	Austria.	Italy.	Russia.	Switzerland.	
By the soldier ...	78	80	70	88	60	100	*By baggage wagon.
Regimental wagons ...	18·1	19·2	52·5	...	60	35	Does not follow Company to battle.
Or packs ...	...	*11·5	...	...	...	...	
Total. First supply for fighting line ...	96·1	99·2 110·7	122·5	88	120	135	
By Division Park ...	46·4	20	22·5	50	60	35	
Total supply for field of battle	142·5	130	145	138	180	170	
Corps Parks	31·5		6†	50		30	† Plus 22·5 by Reserve for the Army.

It will be noticed that the total of small-arms ammunition for the field of battle reaches the maximum in the Russian army, while Germany provides the smallest supply.

The army corps parks being in the nature of a reserve supply their consideration will be left out of this paper, the object of which is to discuss the supply for the field of battle, which is at all times with the troops ready for use. This supply commences in the soldier's pouch, and ends in the divisional train.

The writer who furnished the table just read, referring to it, says : "Must we then conclude that this supply is absolutely sufficient for the exigencies of modern combat ? Such (he continues) is not the opinion expressed by the commission on field firing, which assembled at Châlons in 1878, and according to which every man should have at his disposal one hundred rounds, exclusive of those in the battalion wagons and other ammunition columns. Nor is such the deduction we should draw from a study of accomplished facts in the Eastern war of 1877-78, for in the Russian army the consumption of ammunition during that campaign frequently reached a higher figure even than that named by the Châlons Commission, while in the Ottoman army it attained proportions truly extraordinary * * * certain battalions being furnished five hundred and seventy rounds per man." Again (from the same writer), "experimental firings of the 11th German army corps showed that an average of 100 to 120 cartridges per man was fired in three or four hours time, firing with the utmost deliberation, and the greatest economy of ammunition."

* Most of the data in this paper is taken from the "Ordnance Notes," published by the Chief of Ordnance at Washington.

In the English army, according to Sir Garnet Wolseley, the ammunition supply is :—

In possession of troops	...	rounds 70
Regtl. reserve in wagons	...	„ 30
Field „ „ with division	...	„ 30
„ „ „ „ corps ...	...	„ 30
Grand depôts and intermediate reserves	...	„ 320
Making a total provision of... ...	...	rounds 480

Speaking of ammunition which should be on hand for British troops in their irregular service in India and other quarters of the globe, where English arms sustain English commerce, Wolseley sums the matter up by the conclusion that "special calculations must be made in each instance to meet the peculiar circumstances of the case." With a simple reference to this sentence, I will dismiss from consideration our own irregular warfare against the Indians on the plains and among the mountains of the West.

So far as actual expenditure of ammunition in battle is concerned, some data may be introduced, but it is proper to remark that all authorities agree that calculations for supply should not be based on any general average of expenditure in battle. The reason is clear ; a great portion of troops in battle may not fire a shot, but as no human foresight can determine which battalion will, and which will not, become hotly engaged, the only safe estimate of supply should be proportioned to the possibilities of the tactical unit. Thus, in the 1st Prussian army which attacked the Austrians on the Bestritz river at 8-30 A.M., in July 1866, and remained heavily engaged all day, the average expenditure was only 12 rounds per man, though in one regiment it rose to 72 rounds, and in the case of two companies to 80. The 2nd division of the French Imperial Guards, at Rezonville, fired an average of 20 rounds. The French army of Metz expended only 25 rounds per man, and in the same campaign the 12th German army corps expended in the various battles from 6 to 15 rounds per man. But on the other hand, at Plevna, some Turkish battalions fired over 150 rounds per man.

The United States has had no war experience with breech-loading arms, therefore it is to those countries that have had such experience that we should look for instruction as to the supply of ammunition we would need when war comes. What then is the lesson which the experiences of the armies of Europe teach us ? In my opinion it is, that an American army going to war should have at hand more ammunition than any other army of civilized countries.

In demonstration of this proposition, look at the Russian, the Turk and the German. The Russians have campaigned in a rough country of great extent and bad roads, and know the value of being, in a measure, independent of reserve depôts, and they carry with the troops more ammunition than is provided for any other army of Europe, except the Turkish. With us, condition of country and of roads would be somewhat similar. The Turkish army which fought the Russians, largely made up of raw levies, poorly organized, and wanting in discipline, expended

enormous quantities of ammunition; and, it may be remarked, owe much of their temporary successes to the fact of being so well supplied in that respect.

In lack of discipline and defect of organization, we should not shrink from comparing ourselves, in a certain degree, with the Turk. On the other hand, Germany, a master in the details of the art of war, provides the smallest number of cartridges. But for us to follow Germany in this respect would be to fly in the face of the true deduction to be drawn from a comparison of her ammunition supply with that of other countries.

German officers are, perhaps, the best trained in the world, while the discipline of their army is the development of generations of military service and subordination. In such an army, control of men, and of their every action, reaches the highest possibility, and no cartridges need be wasted or uselessly fired. With us these conditions are reversed. Our national characteristics of self-assertion and of individuality of thought and action—our lack of training, and lack of inherited discipline, our habits of wastefulness—all go to make up a soldier who would consume ammunition only equalled in quantity by the punishment he would inflict on an enemy if he but keep his pouches filled. Again, could we hold as large a proportion of the force in reserve as do the Germans? Would not the American soldier, when brought under the enemy's guns, demand to be placed where he could return the fire? If so theoretical tactics should yield to the national temperament, and more cartridges be forthcoming. One other point, and I will pass to another phase of my subject. Long-range firing is still being discussed by military men, the question mainly hinging on the ammunition supply. It has many advocates and able opponents. I will not quote from these discussions. All remember how effective was the long-range fire of the Turks, and the serious effect it had on the Russians at from 1,200 to 2,000 yards, and even greater distances. With us I think the first battle would settle the question in favor of long-range firing. I predict that the range of our firing will be determined only by the range of our rifles. If for no other reason, I should advocate it as a mere matter of diversion. Although over twenty years have passed since I have heard the whistle of a hostile bullet in regular warfare, I still have most unpleasant recollections of situations where we were placed subject to the enemy's fire without being able to return it. No situation in which a soldier is likely to be placed is more trying to his courage. Nothing causes a greater sense of helplessness. Under such circumstances long-range firing could be made a sustaining power to the soldier's fortitude. This new phase of warfare would also consume additional cartridges.

In view of all these demands, and looking to the experiences of the armies of Europe, I would advocate a supply of at least two hundred rounds of small-arms ammunition per man, or twenty rounds more than is provided for any army in Europe.

The subject of wagon transportation of ammunition now claims attention. In the French army a 4-horse ammunition-wagon is attached to each battalion. It is provided with 3 boxes, each divided into two un-

equal parts. The cartridges are enclosed in canvas-covered bundles furnished with a handle, containing 28 packages of 6 cartridges each. The load of each wagon is therefore 18,144 rounds,—about 2,000 pounds in weight. Each of these boxes is provided with 12 canvas wallets for carrying ammunition to the fighting line. The divisional train consists of thirty-two 4-horse ammunition-wagons of the same capacity and pattern of the battalion-wagons, a forge, 4 horses; a battery-wagon, 4 horses; a forge wagon, 6 horses; and three commissary-wagons, 2 horses. The personnel of this train is: 1 second captain, 2 lieutenants, 1 quarter-master-in-chief, and 7 other quarter-masters (one of whom is an artificer), 1 quarter-master-sergeant, 6 corporals, 1 farrier, 2 shoeing-smiths, 2 smiths, 2 carpenters, 6 artificers, 2 collar-makers, 2 trumpeters and about 150 drivers. If this is a sample of the force the French require to manage a train of thirty-eight wagons, we have nothing to learn from them in that business. On this side of the Atlantic the most reckless general officer would hardly assume the moral responsibility of enveloping one small team in the double and twisted profanity of four drivers, nor would it be necessary. In our language one teamster may generally be relied upon to swear six average Kentucky mules through to the end of the march. But the French seem to be satisfied; for my authority says this train was generally able to follow the troops wherever they went.

In the German army the company baggage-wagon carries 2,880 cartridges. As a rule, it does not follow the company to the battle-ground, and unless the cartridges are previously distributed this supply is not readily available. There is one battalion ammunition-wagon made of iron and drawn by six horses, which carries 19,200 rounds. The divisional small-arms ammunition-train consists of 21 wagons (as above) for cartridges, 1 battery-wagon, 1 forge and 1 baggage-wagon. The train is divided into parts, but for what purpose I have not been able to learn. Why these six-horse wagons carry so small a load—19,200 rounds—is not explained.

The Austrian battalion has ten 4-horse ammunition-wagons, containing each 21,000 cartridges. The divisional train consists of about 200 men, 200 horses and 39 wagons. It carries 22·5 cartridges for each infantry soldier and a supply of artillery ammunition. This is another case of each driver having a horse to himself. The Russians have with each company a wagon or cart holding 11,340 cartridges. It follows the company when the latter is detached; at other times the wagons are grouped by battalions. The divisional train for infantry ammunition has 22 wagons and carries 60 rounds per man. In mountainous countries this train did not give satisfaction, and a number of Russian military men advocate a lighter wagon and the use of pack animals. The Turks use two-wheeled carts, which in their late war accompanied them on the march when they could do so, but in difficult countries packs were found necessary. A battalion has 24 to 30 of these animals, each carrying two boxes of 1,000 rounds. In the English army ammunition is carried with the battalion in 3 two-horse carts, each containing 9,600 rounds. The divisional train carries 30 rounds per man. Provision for

pack animals is made where wagons cannot be used, as is the case in many places where the British army operates. In some instances they use mules, others camels, and in the Bori country men (natives of the country) were used for the purpose. In all of these armies trains move with their commands, unless ordered otherwise for the time being.

In looking over the system of ammunition transport in these armies there are some points it would be well to remember, but in matters of transportation we may safely rely upon our own knowledge and resources, to excel in good results, any management which requires an average of five men to the team to move but indifferently loaded trains on good roads. The proportion of ammunition between the battalion and divisional trains is of interest, because the former is the supply for the emergency of sudden battle, while the latter is more in the nature of a reserve.

I like the Russian plan of a large supply ever present with the troops.

In our service I would suggest 20 rounds per man in the company baggage-wagon, 70 in battalion-wagons and 70 in divisional trains. Assuming that our infantry battalions will be of 4 companies of 100 rifles each, then 2,000 rounds would be in the company baggage-wagon, and 28,000 rounds—or just one wagon-load with the battalion train. The German plan of a few cartridges in the company baggage-wagon is peculiarly applicable to a system of which I shall speak further on.

A distinctive color for wagons of each kind of ammunition, infantry, cavalry and artillery, should not fail of adoption. Not merely letters and marks, but the whole wagon, from running gear to canvas cover, should have its color to correspond to the trimmings of the arm to which it pertains. On the other hand, the Germans and the Austrians require a battalion-wagon on becoming empty to go back to the divisional train; the former to replenish its boxes with ammunition and the latter to hitch its horses to a full wagon, and then return to the engaged troops. Why do this at the expense of twice the time and double risk of accident? Why not at once order up a divisional wagon by fast courier, or field telegraph, leaving empty wagons to go back to the divisional train to stay there until the battle is ended. In furtherance of this idea all infantry ammunition-wagons should be of the same pattern, and some liberal system adopted of messing train men and foraging animals wherever they might be found on duty. Although in some quarters there is objection to a teamster carrying his kit on his own wagon, I see none. In addition to his kit he should have on his wagon, when battle is impending, at least two days' rations and two days' short forage for his teams. This would lessen the ammunition load about 2,000 rounds, but in the end there would be compensating advantages. The ammunition train thus made up, wagons would be interchangeable—that is, battalion-wagons when emptied could go to the divisional train, and loaded ones from the latter take their place with the battalion. The emergency over, all could be straightened out at leisure. With this plan, the temporary mixing of trains would not create confusion, while the distribution of ammunition to points most needing it would be facilitated.

We should stick to our six-mule teams, at least until our country

roads are replaced by better ones. The heavy lumbering wagon of the late war, however, should not be allowed to show itself again. An average load of ammunition for a six-mule team would be from 25,000 to 30,000 rounds.

Good, well-equipped, and well-managed pack-mules could carry 2,000 rounds each, against 4,000 to 5,000 per animal in team. The use of packs would more than double the forage consumption and the personnel of transportation, and would cause the entire ammunition supply to be handled twice a day, at the expense of no little time, night and morning. Therefore, if roads permit wagons, packs should not be used. But an auxuliary pack-train should be on hand, some place in the rear to be taken up in case of need. And it is of the utmost importance that this train be well manned, under experienced boss packers, and in all its appointments splendidly equipped. Nothing pertaining to field transportation is so imperatively demanded as experience and competency in the use of pack animals.

In regard to the disposition of trains on the march, circumstances should govern.

The system of serving ammunition to the fighting line in European armies may be summarized as follows: Battalion-wagons follow their respective commands to a sheltered spot not far to the rear of the line, each placed by the battalion commander and controlled by him. Company commanders of their own action draw on this wagon, and in the same way battalion commanders draw on the divisional train. After exhausting their own supply troops may draw on other wagons.

No formal demand nor receipt is exacted. With the Russians, who have a wagon to each company, but one to the battalion follows; the others are grouped by battalions farther to the rear. Flags by day and lanterns by night are placed a short distance to one side to denote the location of the wagons, but not so as to discover them to the enemy.

Communication is kept up between the wagons and the troops by mounted orderlies. To overlook these simple and common-sense precautions might cause the loss of a battle. On going into battle, the Austrians give out 10 rounds per man from the battalion-wagons. At the beginning of an engagement a party of two to four men is detailed in each company to go to the wagon, where they divest themselves of equipments, and with the wallets and bags provided for the purpose, and kept with the wagons, they commence carrying cartridges to their companies. The German soldier carries 500 rounds at a load, the Frenchman 360. If the distance be considerable, say 1,000 yards, 500 rounds is too heavy a load. The Germans hand the cartridges to the fighting men, but the Austrians empty them on the ground for each man to help himself.

Except on the defensive, under cover, I should think the latter plan faulty, if not disastrous. In most armies men are specially trained for this duty, but the Austrian captain may send musicians without reference to their special fitness. For this all-important duty none but the best of men should be selected, and the most reliable and courageous non-commissioned officer in the company should be in charge of the party. If

additional force is needed to fetch ammunition, it is taken from the supports or reserves, never from the fighting line. The Turks on the defensive placed boxes of cartridges along the entrenchments. Pack-mules were used by them to deliver cartridges to the skirmish line, and they performed the duty well.

In this outline description I have tried to present the prominent features of cartridge-service in the German, French, Austrian, Russian and Turkish armies. Turning to our own service I don't see how we could do better than adopt substantially the same means of distribution. I should think, however, that at this point the mule might step in and assume that importance for which he is so justly celebrated in our army. The war of 1861-65 demonstrated the fondness of the American general and the American soldier for temporary entrenchments on the field of pitched battle. With modern arms cover is still more desirable, and the next war will probably bring into use regular entrenching tools as part of the equipment of a company of infantry. Not a mere makeshift, such as a trowel-bayonet, for instance, but serviceable spades and picks. Hence, I say, these tools will be a part of the equipment of a company—not of the individual soldier. Means of transportation for these tools other than the soldiers' legs should be provided, and of a nature that would insure their presence ever with the company. Pack animals would answer these simple but important requirements. Two mules could carry the entrenching tools for a company of one hundred men. When the tools would be called into use, ammunition would be required, and the mules relieved of one duty would stand ready for the other. Thus, incidentally and without increase of forage supply or impedimenta, each company might have the services of a friend who, if properly rigged, could be of material help in delivering cartridges to the fighting line. For pack rigging I would suggest wool-lined panniers to receive the loose packages of cartridges, with cases made of heavy leather to fit in the panniers for the spades and picks to rest in. In unloading the tools the cases would be taken out, leaving the panniers ready for instant use with cartridges.

The soldiers' cartridge equipment in European armies, consisting of a pouch, carries about half of his personal supply. The remaining half—30 to 40 rounds—is in the knapsack. English infantrymen have a ball-bag, which habitually carries 10 rounds, but holds 40 when required. In taking extraordinary supply of cartridges the German soldier puts packets in his havresack, and pockets and buttons them inside of his blouse. This is in addition to his knapsack supply.

The objections against the knapsack as a cartridge receptacle are manifest. General Ingalls estimated that 25 per cent. of the army of the Potomac threw their knapsacks away, while in Sherman's army not half of 25 per cent. of the infantry retained them. Again, it would often be necessary to order that they be left behind, and, in that case, the ammunition which would of course be taken from them would be in the hands of the soldiers without means on their part of taking care of it. But in the absence of these objections there remains the more serious difficulty of quickly getting at the supply in time of need.

The use of the havresack for cartridges is condemned. Soldiers must eat, and that article of equipment should be sacred to its legitimate use. The English ball-bag may in a measure supply the want, but it has the fatal objection of being an extra piece not in constant use, yet to be constantly carried and cared for, that it may be on hand at some future time, for possible use in battle. Only a high state of discipline, and the never-ceasing watchfulness of officers, would prevent men from throwing such things away. Officers of experience with volunteers will appreciate the force of this objection. The fewer pieces a soldier has to carry the better condition is he in to march and fight. To get over the knapsack difficulty the French have experimented with an equipment consisting of four pouches, of twenty-four cartridges each—two on the waist belt and two suspended on the shoulder-blades by a system of straps and braces. It is cumbersome and complicated. To get at the reserve pouches straps and braces have to be unfastened and hooked up to prevent their loss, and finally the knapsack (with no blanket-rolls) has to be taken off before the pouches can be replaced on the back.

In dwelling, as I have, on the demerits of the universally accepted mode of loading a soldier with his battle supply of cartridges, I have done but little more than condense what has been more fully and better expressed by distinguished military men in this country and Europe. The whole thing is admitted to be unsatisfactory and inadequate to the necessities of the breech-loader, and the practice is only continued because no better plan has yet been proposed.

A study of the subject only confirms the conclusions which military men have deduced from experience and observation, and which may be summarized in few words. Breech-loading arms demand large quantities of ammunition. Celerity of movement require light marching loads on soldiers. Cartridges should be independent of other equipment. It is of the first importance to secure the best means of quickly augmenting the supply of ammunition at the beginning, and of replenishing it during the progress of battle. Cartridges should be in convenient shape for handling.

I have devised a method which I think satisfies these demands. It begins at the armoury in packing the cartridges, as follows: A strip of light cotton-cloth, $7\frac{1}{2} \times 22$ inches; near the middle, running from end to end, sew a strip of the same material, $1\frac{1}{2}$ inches wide, and provided with 20 loops, $\frac{1}{2}$ inch apart, for individual cartridges. Pack the cartridges in the loops. Fold the top edge, or flap, of the wide strip over the heads of the cartridges, bring it down and stitch it to the opposite edge at the ends and between every second and third bullet. This flap secures the cartridges in the loops; to get at them, break the stitching, exposing a few at a time. To each end of this "packet" securely sew a strip of the same material 2×25 inches. The other ends of these strips securely sewed together, or use one strip 48 inches long instead of the two. All ammunition to be kept up in these packets instead of in the paper case as at present. In this shape the cartridges go to the soldier convenient for instant use. He takes the packets, swings them over either shoulder "shot-pouch fashion," or ties them around the waist, over the permanent belt, and is ready to march or fight. When

emptied in battle the packet is thrown away. The packet is not designed as an accoutrement for the nominal supply of cartridges on the soldier, but as a means of dispensing altogether with accoutrements and makeshifts for the battle supply, and to facilitate the handling of cartridges.

No resort to knapsacks, havresacks, blanket-rolls, or other makeshifts necessary—no special accoutrement to add to the soldiers' load for months before needed, and which at best is not as convenient as this simple packet, which is practically without weight or bulk, and whose carrying capacity is limited only by the weight of cartridges a soldier could march under. No wallets and bags needed for distribution from the wagons to the line of battle, such as the French have thirty-six of to the wagon, and the English and German nearly as many.

The advantages of the packet extend to all phases of cartridge handling, but perhaps none would appreciate it more than the man who, when hotly engaged, should receive from the ammunition party one or more, which he at once slips over his head, and his cartridges are safe and more easily got at than if in the box or belt. Contrast his condition with the man, similarly situated, who should have two or three of the present paper cases of cartridges put into his hands.

To supply more ammunition for battle, and at the same time put a less quantity on the person of the soldier while on the march than is done in other countries, may seem paradoxical. But I believe that to be the true policy. Celerity of movement is so potent a factor of success in war, that our study should be how to sustain the minimum number of cartridges on the soldier—not the maximum. Stonewall Jackson had the genius of using men's legs, and he was the scourger of the army of the Potomac. I would stick to old traditions, and fix the soldier's marching load of cartridges at forty rounds.

To meet this condition of so small a supply of cartridges on the soldier, it is of the first importance to provide the best obtainable expedient for quickly handing him his battle supply from the wagons, and in a shape to enable him to take care of it, and have it at all times convenient for use. I think this packet meets these requirements. To anticipate some of the objections which may suggest themselves against the proposed system.

First (which really includes everything), would it answer the purposes for which it is designed? Actual experience alone can conclusively answer this question. To say that it is worthy of trial is the utmost that should be said of any new and untried device. Second, its durability; made of common cotton-cloth, of the strength of goods in a shirt, the packet would stand hard usage in service for any length of time that extraordinary supply of ammunition would be needed in the hands of troops, say six or eight weeks. Third, the cost. The extra expense would be but trifling—not over one-fourth of one cent. per cartridge.

At this rate 100,000 infantry could expend in a battle thirty rounds per man, and the extra expense chargeable to the packet would be but $7,500. But if the system would facilitate the handling of cartridges, cost is not properly an objection, for at best war is an expensive game, made doubly so no less by parsimony than by waste.

In conclusion, I think there are two conditions in themselves tending in opposite directions, which it should be the effort of military men to reconcile to each other. That is, a large battle-supply of ammunition and a light marching load on the soldier. In harmonizing these conditions it is necessary, first, to divest the soldier of everything useless or superfluous.

And in this connection, it may be proper to fire a few interrogation points at a questionable piece of impedimenta which perhaps it were better to relegate to a position of rest alongside that friend of its youth, the old flint-lock musket. If its days of usefulness are really gone, we need its place for cartridges. I refer to the bayonet. Why do we keep it? Is it because it has kept abreast of the breech-loader and the machine-gun? Or is it sustained at the soldier's side by a sentimental regard for its past services? We are told that it is still formidable. Where, when, and how? You can't convict a man of murder before you find the corpse. That is a principle of law. Then why allow the bayonet to revel in the reputation of a man killed, and no corpse in sight? The effectiveness of a weapon is determined by the nature of its opponent. With breech-loaders, long range, and open ranks, how does the bayonet stand? The moral effect, it is claimed. That is well enough; moral effect may be tangible power, if allowed to have its own way. But when we reflect that the bayonet displaces, by actual weight, eleven cartridges, and by extra inconvenience at least four more, I contend that these fifteen metallic cartridges could shoot the phantom of moral effect to death.

The infantry is now recognized as the real power of an army. How did it gain this position? By prodding men to death with a bayonet, or by shooting them? With breech-loaders, if the infantry maintains its place, every means must be used of solving the important problem of ammunition supply. A soldier is loaded with all the cartridges he can march under. Throw the bayonet away, and he could take fifteen more. Is it remembered what less than fifteen cartridges per man did in the hands of the Germans in July, 1866? They defeated and humiliated one of the great powers of Europe. The bayonet, too, was there on that bloody field of Iodowa, and yet when the battle was ended, of all the 27,000 men who lay dead or wounded, not one could it claim as its victim. What does the bayonet cost an army? I do not know, but here are some of the figures for a twelve months' war, with an army of 500,000 men. It at once and continuously crowds 7,500,000 cartridges out of the soldiers' pouches. It sends this ammunition miles to the rear, where it imposes the expense, and a hundred-fold worse, the impedimenta of over 600 wagons and 4,000 animals, including the furnishing of the extra forage and supplies involved. At this rate the animal forage consumption chargeable solely to the bayonet, and which would tax the resources of transportation and encumber the roads, would be over 33,000,000 pounds, or more than 11,000 wagon-loads. If the fighting power of the bayonet is a compensation for all this, it should be retained. On the other hand, if the balance be against it, then the bayonet should be thrown away and its place filled with cartridges.

THE EMPLOYMENT OF DYNAMITE AS A BURSTING CHARGE FOR ARTILLERY PROJECTILES.*

By Adolfo Carrasco.

Among the high explosives, that is to say those which exceeding the ordinary, such as the different war powders, are capable of producing very violent and powerful detonations, we will consider here only those of nitro-glycerine, or the dynamites; detaining ourselves only with the generic dynamite which is that of the inert silicious base, and mentioning, in passing, that of the explosive base called the gum dynamite or explosive gelatine, since the others pertaining to these two classes, as well as those of the active base, are little known or little apposite for application to the problem proposed. And, as the properties of dynamite are derived from those of nitro-glycerine, it is necessary so say a few words about the latter.

Everybody has heard of the dangerous qualities of nitro-glycerine. It is extremely sensitive to shock, a small flask containing it being detonated by falling to the ground—the same occurring on account of a violent jerk—or strong pressure of friction. Although fire causes it to burn tranquilly, if the quantity is considerable, it does not lose its explosive power; it may safely be rapidly heated to 200° or placed in contact with a very lively jet of heat. If it has nitric acid in excess or some has become free, as happens from its exposure to light or humidity, it proceeds to decompose, effecting it successively with increasing velocity until it detonates. Another property very interesting is that of freezing from 12° (Cent.)† downwards.

Dynamite, being nothing more than nitro-glycerine confined in the pores of a completely passive material, it is clear that its properties must be the same as those of nitro-glycerine, with the attenuation consequent upon finding itself divided into isolated particles and upon the action, absorbent of heat and of shocks, exercised by the inert body; thus it is that it may better suffer blows and frictions, and its handling is relatively safe, provided always that it be well-made and conserved and one works with due precaution. But as these requisites, and in particular the two first, are very difficult of realization, it is not prudent to put much confidence in it.

Yet, with the conditions expressed, it detonates by the shock of metal and hard bodies and by every kind of powerful blow, among others that of a musket ball which reaches it with much velocity: being so much the more sensible to these accidents as it is richer in nitro-glycerine and higher in temperature, and above all when enclosed in a resisting receptacle. At the Washington Navy Yard three dynamite shells were fired

* Translated from the *Memorial de Artilleria*, November 1885, by Major Geo. W. McKee, U.S.A.

† It freezes at 40° (F.) very nearly. (Trans.)

from a gun of eighty millimetres (3·15 in.) and, in spite of their carrying no fuses, they burst on striking the target (although with very little damage to it). In the open air a powerful hammer blow upon a small quantity causes only the portion struck to detonate ; but the explosion is general if it takes place in the bottom of a receptacle of whatever capacity.

It resists without alteration a gentle and progressive augmentation of heat. On contact with fire, or through a rapid elevation of temperature to 200°, it only burns tranquilly ; but this is in the open air, while in a resisting receptacle it detonates violently, as well as when the quantity of explosive is great.

Below 10° or 12° (Cent.) it freezes, the detonation then becoming difficult. In such a state it hardens and expands because of the crystallization of the nitro-glycerine on congealing, and the latter is able very easily to exude from its original lodgments, and to leave some of itself outside of them when it thaws ; neither is this exudation impossible with the extreme heat of our climate. Also it evidences itself often through other causes, as, for instance, the small absorbent power of some of the silicious earths or an extreme dose of nitro-glycerine, without counting a bad execution of the final purification, which has for its object the exterior cleansing of the silicious grains from the nitro-glycerine which moistens them when the dynamite is prepared.

As three kinds of dynamite exist, called No. 1, No. 2 and No. 3, containing 75, 50 and 30 per cent. of nitro-glycerine respectively, it follows that the exudation indicated will probably diminish the measures of these proportions, and the potency of the explosive will be diminished in the same ratio ; and, much exactness in it being necessary for the uses of war, we need not go below No. 1. Well, then, from the moment in which there is exudation of nitro-glycerine the latter entirely recovers its characteristic properties. Thus is shown the imprudence of heating dynamite to thaw it, and the high sensitiveness of this explosive in such a disposition ; and the like up to the point of its being seen to detonate when a cartridge is cut with a hacked knife, or it is rammed into drill-holes.

Another bad quality of dynamite is based upon the spontaneous alteration of nitro-glycerine by light and humidity, from which results free nitric acid which may exist originally through bad manufacture, as has been said. This phenomenon creates an imminent predisposition to detonate with so much greater facility as the envelop containing it may be more resistant and the developed gases may have less space to dilate in. On this account it is stronger packed than loose, and the keeping of it is dangerous at the temperature of summer if an active ventilation is not established (this again often opposes humidity), and for an equal reason it should be stored in receptacles of little consistency.

Dynamite, even when congealed, is susceptible of being exploded through the influence of other explosives of the same material which manifest themselves at distances more or less great, according to its degree of sensitiveness, being able to explode thus divers cartridges in line, although not indefinitely, since the explosives diminish in intensity as they recede from the initial point.

The absolute density is 1·6 ; the relative 1·5.

We see that dynamite is very delicate ; and if we endeavour to make it less sensitive by the incorporation of camphor or other bodies of like effect, it is at the expense of a great deal of energy ; for which reason it is intended to substitute it (camphor) with other explosives, like the gum-dynamite or explosive gelatine, composed of nitro-glycerine and collodion or compressed gun-cotton.

This other explosive, when it contains four or five per cent. of camphor, needs for detonation an initial shock six times greater than dynamite, properly speaking, and for the same reason it is less liable to be exploded by sympathy ; but in alteration it is more difficult to provoke its action. Congelation does not diminish its energy but increases its sensitiveness, counteracting the good offices of the camphor. It burns in the air without explosion in small quantities ; heated slowly it detonates at a little over 200° ; water does not decompose it ; it does not exude and is of greater effect than the better kind of dynamite. By prolonged exposure to temperatures which approach 40°, it loses its camphor and then detonates on shock ; and, on the contrary, it loses its power of detonation when the camphor reaches 10 per cent. Notwithstanding, it may be on account of uniformity not having been followed in its manufacture, or for other causes, the results of experiments do not appear to have been satisfactory.

These remarks are indispensable preliminaries to the application of dynamite to projectiles as a bursting charge, since in such an act the explosive referred to will have to be very rich in nitro-glycerine ; will be used compactly in receptacles of iron closed with resisting walls ; will be immediately contiguous to fire and submitted to the sympathetic influence of explosions ; exposed to blows and percussions of all kinds ; and subjected to the causes with determine its decomposition. It is true that Industry consumes annually millions of kilogrammes (although not without repeated disastrous results), and that the military art employs it frequently, principally in the engineering branch ; but all these applications are of a tranquil character and permit a method and care which are impossible in that of which we treat.

Its not being desirable for adoption in torpedo use by our navy, or others, serves as a confirmation. For the same reasons which have induced to establish these premises, we will commence now to speculate superficially upon the explosions, considering them under an equal point of view.

It is known that, in order to assure the explosion of dynamite, certain kinds of fulminating primers are necessary—distinguished from the ordinary by being called detonators, and composed generally of a quantity of fulminate of mercury which ought not to be less than half a gramme (7·7 grs.) for dynamite of the first quality, and which should come up to one and a half (23 grs.) when it is frozen ; and this is not simply to unite with the dynamite a proportional weight of unfrozen fulminate. It is from noticing that, when frozen, it detonates badly, greatly in proportion as its contact with the detonator is badly established. Explosive gelatine requires that a certain portion of dry

compressed gun-cotton should be interposed in order that it may act directly upon the gelatine after it (the cotton) has received the action of the fulminate-detonator. And this complication of primer is another of the reasons why this explosive has not prevailed.

According to Berthellot, the explosion takes place through zones in the following manner: The released gases of the first inflamed coating (or of the detonator) precipitate themselves upon the immediate coating, exercising upon it a violent pressure which may be considered a blow, converting its living force into heat which evolves suddenly new gases; these shocking the contiguous coating there is another transformation of living force into heat and a consequent evolvement of more gases, or, if you please, explosion, and so on successively. This manner of propagation presents phenomena analogous to those of the Sound Wave, and has received the name of the Explosive Wave.

It is well known that the explosive wave, being in nitro-glycerine, such as has been indicated, will experience in dynamite modifications on account of the interstices and silicious portions interposed, which form a kind of elastic cushion whose influence will vary also with the proportions of nitro-glycerine. The camphor alters the wave because it lends a certain elasticity to the mass and compels the mutual dependence of the particles, and thus the shock is propagated to greater masses and expends itself partially in the work of dislocation.

It is equally conceded that the more violent the first shock the more lively will be the explosion, and that for the same stroke these explosions may be very variable in intensity—the same quantity of dynamite being able to produce very different effects according to the methods of initiating and of realizing the phenomenon. Bearing this in mind, at present we concede explosions of the first and second order, although the dividing point has not been well determined, the last being the stronger,* and those which are needed for the bursting charges of projectiles. And we have seen in fact that, in order to burst a shell when the dynamite is thoroughly detonated by an explosion of the second order, the work will be performed by one half the charge that would be required in an explosion of the first order.

Instantaneous as the detonation may appear, it has been observed that it is far from being indifferent to the point whence it is initiated; if we credit the experiment made with charges of dynamite suspended touching a vertical target of iron plates, they are much more damaged when the detonator is placed near the exterior part, or the point opposite the point of contact with the plates.

The local effect is estimated to be in the inverse ratio of the cube of the distance to the point of explosion; if, at the distance of a centimetre, we estimate its work as 1,000, at ten centimetres it would only be one.

From what has been expressed, it is easy to reflect that, on a par with the probabilities of inopportune and disastrous explosions, there enter into the problem the difficulties of attaining timely detonations of convenient magnitude.

The principal features of the explosions having already been considered,

* The order of explosion seems to be a matter of convention.—TRANS.

it is convenient to know their practical effects relative to the application which we are considering. Commander Folger, in the United States of America, has made several experiments against a target of eleven one-inch plates united solidly to each other and to a strong backing of oak. The charges were contained in bags suspended leaning against the target and with the detonator on the outside part. The first ten detonations, with charges from five to seventy-five pounds of dynamite, caused no change in the target. An experiment with one hundred pounds produced an indent of two inches, greatest depth, and having a diameter of two feet, causing the exterior plate to loosen itself at the extremities and to separate from the one next to it, the contact being preserved perfectly in the others; and, although the mass acquired a movement of translation of two inches, it returned of itself to its primitive position. In the other experiment another plate was arranged horizontally, touching the target with one of its edges, so as to represent a boat and the surface of the water, and a charge of seventy-five pounds of dynamite was placed in the dihedral angle, or water-line. The former impression was deepened an inch more and the edges of the plates were doubled or buckled outwards, but without being loosened or suffering other injuries more than the natural racking would leave in the vicinity of the shock. Also the target was repelled backwards two inches and likewise recovered its original position. One of the sides of the backing, which had several augur-holes corresponding to bolts used in other operations, was broken, the whole unhinging itself a little; but it is to be observed that the target endured resisting a number of explosions which represented 440 pounds of dynamite. The horizontal target was crushed, destroying completely the frame which sustained it.

From these experiments Commander Folger deduces that a modern iron-clad will suffer nothing by an explosion in contact above the water, and little more at the line of flotation or water-line, with charges greater than one hundred pounds of dynamite; and it is clear that it will be much less if the explosion manifests itself after the projectile rebounds and is at some distance from the vessel, as well as when it breaks before detonating, which would be equivalent to an explosion in the open air. A greater result would be obtained in case of penetration; but, even supposing that detonation would not take place from the shock, which is contrary to experience,* we must discuss the explosive force with which the projectile should be endowed.

As a general rule investigators have abandoned penetration, contenting themselves with explosions of contact much less powerful, and all the published experiments agree with the preceding. During the years from 1874 to 1876 some were verified in Sweden, modifying the results of others made before in America† by Capt. Lauer against plates of iron of three inches in thickness without any backing, from which he had deduced the formula :—

* If it is intended to convey the idea that explosion on impact will be so instantaneous as to prevent a decided penetration, even when *uncamphorated* explosive gelatine is used, I think the author is undoubtedly in error.—TRANS.

† Austria?—TRANS.

$$W = d^2\, b;$$

in which W is the charge in pounds of dynamite No. 1, d the thickness of the plate in inches and b its breadth in feet—the explosive being in a cylindrical cartridge of $1{\cdot}5 \times d$ diameter resting horizontally across the full width of the plate. The Scandinavian Commission employed for the charge cubiform boxes, diminishing thus the extension of contact, and deduced as a conclusion that over plates of five inches they were not able to obtain decisive results with charges less than seventy-seven pounds of dynamite No. 1. They modified the formula, making:

$$W = 3{\cdot}3\, d^2;$$

having adopted the co-efficient 3·3 as being the most appropriate for the width it is customary to give shield-plates, and depending on the condition that the thickness of the charge, in a direction normal to the plate, must be not less than once and a half the thickness of the iron.*

According to these principles, for a plate of five inches there results 82 pounds; for one of ten there are 330 pounds; and for that of twenty-four, of the Inflexible, 1,900 pounds; all on the supposition that the detonation is verified above the surface of the water, or very little below it.

Although this formula is empirical and only applicable rigorously within the limits where we find it, various latter experiences, it appears, have caused it to be seen that it is acceptable generally. This being so let us consider what shells, and consequently what guns, it would be necessary to employ when the projectiles of 100 ton guns have capacity for seventy-five pounds only. Notwithstanding, some experiments at Brest are cited in which the effects were more considerable, if indeed not so great as to do away with charges impossible in projectiles commonly used.

With these preliminaries we can now proceed to examine the more notable trials and experiments which have been made with dynamite shells.

Having in mind all the circumstances expressed, and to avoid the initial blow of the ordinary charge of powder, in the United States they have planned, or rather they have wished, to make a practical use of compressed air, from very ancient time adapted to the air-gun, although now relegated to laboratory experiments.

The piece called the compressed-air or pneumatic, and also dynamite, gun is a cylindrical tube of bronze without solder, one quarter of an inch thick, four inches in calibre, and forty feet in length fitted to a frame or stock of steel with trunnions. This species of carriage is mounted in a support gyrating over a foundation pedestal, and in such a manner that it may easily receive any desired inclination. The air is directed from a receiver to the gun by a conductor, which, passing through the axis of one of the trunnions of the carriage, is stopped at the breech where there is an intervening valve, by means of which the fluid may

* See Paper on High Explosions, by Gen. H. L. Abbot, U. S. Engineer, in JOURNAL OF MILITARY SERVICE INSTITUTION, June, 1885.—TRANS.

be introduced into, or cut off from, the bore. The projectile is a cartridge of a thin sheet of copper attached to a wooden spar, which at its posterior base perfectly fits the gun, having between the cartridge and the spar an air space to soften the first impulse. The head of the cartridge is of a soft material which, yielding to the shock, causes the plunger which it carries for this purpose to operate against the primer. The centre of gravity is situated behind that of figure with the intention of avoiding the deviations arising from the lateral wind. After the projectile is inserted the valve is opened to discharge it.

In the first trial, made before Lieut. Zalinski,* the representative of the United States Government, a pressure of 420 pounds per square inch was exercised, obtaining a range of one quarter of a mile. They at once constructed another gun of somewhat greater calibre, capable of supporting 2,000 pounds pressure and carrying 24 pounds of dynamite; but neither has the pressure exceeded 500 pounds, nor has the range been greater than 2,100 yards—the degree of accuracy leaving much to be desired. Notwithstanding, as it is possible indeed to increase the former quantities, it appears that they have under consideration another gun for projectiles of 100 and 125 pounds of explosive. But the same inventor has not thought to replace with his gun the pieces of large calibre, having presented it only as a variety of torpedo-thrower, certain ships being applicable to carry it in their sides. For the rest such an invention neither by its arrangement, manipulation, nor effects can be ranked as artillery, nor can we expect from it shots that which we do from projectiles charged with dynamite, as Lieut. Zalinski has reported to his Government, and therefore it is useless to dicuss it further here, what has been said sufficing to justify its exclusion.†

The project of Mr. Jamotte merits little more than to be mentioned.‡ He censures all idea of employing high explosives in projectiles, and proposes for the occasion, in place of these, balls of leather or linen filled with the same materials, throwing them from highly perfected catapults; although retaining their use to the last period of sieges, and without aspiring to the range, accuracy, and effect, which dynamite shells promise, and which in his judgment cannot be realized.

As soon as the explosive power of dynamite began to be known the thought germinated of employing it as a bursting charge for projectiles, since with it they exploded with great violence, producing a much larger number of fragments endowed with a force of projection notably more

* Lieut. Zalinski is not understood to represent the Government in this matter.—TRANS.

† *The Scientific American*, received after this article was composed, says that in a recent trial the pneumatic gun threw one hundred pounds of explosive gelatine two miles. The calibre was eight inches and the length sixty feet.—TRANS.

‡ As dynamite, being no respector of persons, elevates the just and the unjust, no such inspiration as this of Mr. Jamotte has been presented to military men since the days of the historic John Harolson; and, if nothing untoward happened, we must in all candour admit that it might be as successful as the effort of Professor Moses when he elevated Dr. Corah and his unpleasant crowd in the desert.—TRANS.

great; but the instability of that explosive has not permitted a free and full entrance into the road of investigation, and the isolated and incomplete studies we know of are impregnated with the timidity which this indomitable agent inspires.

The Committee of Defence, at Paris, in 1870, proclaimed *à priori* the possibility of employing dynamite in shells, and counselled the advantage of doing it, since with an equal volume the effects of dislocation were ten times, and the work of projection three times, greater than with war powder; but it took care to add guardedly that the dynamite ought not to be very rich in nitro-glycerine, which much reduced the qualities which gave weight to that incorporation. And, in fact, they fired some shells with charges of 200 and 300 (7·5 and 9·5 oz.) grammes of dynamite of fifty per cent. whose effects have been forgotten.

At the same time, in Norway, they fired a few rounds with a Krupp gun of 6·8 inches, testing dynamite projectiles; but when the charge of gunpowder reached a pound and a half it burst the shell in the bore of the gun, rendering it useless. Before that, in Sweden, they had fired with guns of 18 pounds calibre, using two pounds charge of projection, some shells containing approximately a pound and a half of dynamite. They say that no accident occurred, but neither have the experiments continued nor have they adopted dynamite there for these purposes. In England experiments have also been made without results. In the United States alone they persevere with the hope of success, although not by the ordinary procedure, for there also they have experienced premature explosions and the mutilation of pieces. For that reason they have had recourse to other methods, the one which prevails being that of Mr. Snyder,* in which war powder serves as the propulsive charge, and the features of the projectile are modified to the point of divesting it of its ballistic conditions. The principle could not be more elemental, *viz.*, to avoid the shock of explosion, interpose a body that will mollify or reduce it sufficiently.

Mr. Snyder, after having tried in vain a system of accelerating charges, made use, in 1884, of a Rodman gun† of 16 pounds calibre, with a charge of black powder and an ogival shell. This was supplied with a wooden appendage or tail joined to an elastic obdurating plug resting immediately against the powder. The plug is composed of four disks of wood; between the posterior or first and the one following it there is a cup of leather with the border repressed over the lateral surface of the first, and the same between the second and third; and over the third, which is convex in front, another cup appears covered with a cap of sheet copper, with the border or edge doubled, constituting the true obdurator; and in continuation the last disk is well adjusted to the bore of the gun—the whole being joined together by means of a spindle which traverses them in the direction of the axis.

* Mr. Snyder's devices, so far as they are known, have never "prevailed" to any extent in the United States.—TRANS.

† There is no Rodman gun of this calibre. Mr. Snyder first used a 12-pounder Napoleon gun; then two obsolete cast-iron 24-pounder siege guns, which he burst; and latterly a Moffatt howitzer, bored up to six inches.—TRANS.

The tail or spar is a cylinder of wood with some helical flanges like wings, to assure correctness of flight and causing it to gyrate when it strikes the water. Between this piece and the shell is a cylinder of India-rubber, perforated longitudinally in various places, the mouths of the perforations being covered with a metallic lid which embraces the cylinder. This, by its natural elasticity, increased by that of the air contained in the said perforations, contributes to reduce the shock of the explosion. The entire length of the apparatus is 2·75 metres (9 feet), although, for the land service, it appears it may be reduced to less than one metre (3·28 feet); the weight is 6 kilogrammes (13·2 pounds). The charge of the shell was 2·268 kilogrammes (5 pounds) of dynamite (probably of inferior quality), and that of projection 1,700 kilogrammes (1·54 pounds) of black powder. Plate 11 explains this very well. It is said that all accessories which constitute the buffer were separated at 200 yards, were collected intact, and that the projectiles attained a range of three-quarters of a mile on land and ricochetted in the water. The recoil was very little.

In July of the same year, 1884, other trials were made at Sandy Hook by the same procedure. The piece was an 8-inch rifle; the shell carried five and a half pounds of explosive gelatine enclosed in a thick paper case, this case being coated on the exterior, and the shell being coated on the interior with graphite*; there was a cushion of cork in the bottom of the shell beneath the case, and a hollow India-rubber cylinder, closed at both ends, between the powder charge and the projectile. At the first discharge the projectile burst against the target without doing any damage, and, at the second, in the mouth of the piece, mutilating the rifling in this part. No detonator was placed in the shell, and we do not know the charge of projection and the distance to the target.

Let us see now the experiments at Point-Lobos, directed by Col. Kelton, in March of this year. He used a 3-inch wrought-iron rifled gun; shells with 200 grammes (7·5 oz.) of dynamite and a variable charge of projection; since in the first round there was little more than 100 grammes (3·75 oz.); in the second than 225 grammes (8·44 oz.); and in the third than 450 grammes (16·9 oz.) approximately. The target was a large rock at 157 yards distance. In the two first rounds the shell burst into innumerable pieces on striking the rock; but in the third it burst within the piece, dividing it into three parts, one of which was thrown 90 metres (295 feet).

Further on we will see the favourable conclusions which common report has drawn from this trial. General Abbot does not find them so satisfactory.

* The theory was that the angular velocity might elevate the temperature sufficiently to explode the gelatine. Hence a paper case was used, having two diaphragms, crossing each other at right angles within it; and the exterior of the case and the interior of the shell were coated with graphite as a lubricant. There was enough play between the case and the shell to permit the latter to rotate about the former, so that the gelatine would have little if any rotary motion, and the heat, due to the friction, would have to pass entirely through a quarter of an inch of paper before it could act. The paper was of the kind buckets and car-wheels are made of, and was supposed to be the best available non-conductor.—TRANS.

Other trials were made with a piece of 15 centimetres (6 inches), using an explosive charge of 5·4 kilogrammes of gelatine and a maximum charge of prismatic powder for that of projection. The projectile burst on striking the target, destroying it completely and injuring the wall against which it rested. The window-panes of the houses were broken for 300 metres (984 feet) distance. We fail to learn the distance of the target and its strength, which from appearances was not great.

More trials were made during the same month, on the banks of the Potomac, with a piece of the same calibre, the explosive charge being five scant kilogrammes (11 pounds) of gelatine, and the target a large rock at 914 metres (998 yards). The first shell exploded in the target disorganizing the rock for a radius of 9 metres (29·5 feet), and throwing several tons of material to more than 150 metres (492 feet) distance. The second burst on the stony ground in front, producing a crater of 7·5 metres (24·6 feet) in diameter and 1·8 metres (6 feet) in depth, and throwing the fragments for a distance of half a mile. The other two discharges that were made produced similar effects. Besides the quantity of charge of projection, it would be well to know the nature of the rock.*

New experiments were made in May, near Georgetown, with the object of demonstrating the security of firing which the Snyder system offers, to which system all these experiments relate. The results were like the former.

Nordenfeldt asserts that he has obtained 2,000 feet velocity firing explosive gelatine shells from his 6-pounder gun.

Such are the principal performances investigated, although not with all the details which could be desired to know them thoroughly and to be able to reproduce them. Before passing any judgment it will be well to show the impressions and opinions of the experts who have studied them prior to and better than ourselves.

Col. Kelton considered the first experiment at Point-Lobor very satisfactory, where the gun burst at the third round with a charge of one pound of black powder—that of dynamite being seven ounces—since it demonstrated the possibility of employing dynamite in shells, as well as the great strength of this explosive; and he estimates that, for the effective use of these artifices, which, according to him, is to destroy ships, one half the length of the projectile is the penetration needed, requiring 0·001 of a second, and he expects that it will be successful.

General Henry Abbot,† a competent authority on the subject, believes that upon explosions, superficial or in contact, of dynamite and its kindred compounds, we are able to found very small hopes, since it is not possible to cause much effect upon iron-clads, for instance, without previous penetration; and, it being necessary for this to have high

*Limestone, or, rather, Dolomite.—TRANS.

†General Abbot, in his paper published in the JOURNAL OF THE MILITARY SERVICE INSTITUTION, June, 1885, says: "The use of high explosives in shells require no new or expensive outlay, for we must have the guns and shells in any events. It only demands *knowledge*, which may be acquired by judicious experiments at no great cost."—TRANS.

velocities of arrival, projectiles of the best steel, and calibres not under 12 inches, we are very far from realizing this much desired end.

Mr. Jamotte,* the resurrectionist of the catapult, in consequence of judging dynamite shells impracticable, is of opinion that high explosives may be only projected by special processes which eliminate every cause of accidental explosion, it not being worth while to seriously consider them in fire-arms unless said explosives are weak, or loosely packed, in which state they are unsuitable for the object.

Mr. Brialmont takes the ground that if, indeed, charges of dynamite in contact operate efficaciously against earth and stone works, they are not at all formidable against works armed with plate, much less so bursting, as they commonly do, after rebounding; and that the true projectile, until now not summoned for this purpose, is of forged and tempered steel, † impelled with great velocity. He adds that the only positive demonstration of projecting charges of dynamite is that of the pneumatic gun.

The Scientific American, in spite of its affiliation, at present takes the stand that the properties of high explosives will not permit their use in pieces of artillery by the ordinary system of firing, since they occasion the destruction of the guns.

The Army and Navy Journal, speaking of the piece burst at Sandy Hook by a premature explosion, says that the event was entirely in consonance with its predictions anent the subject.

The Army and Navy Gazette maintains that, while dynamite shells have caused considerable destruction against rocks at a short distance, the case of throwing them to a great distance to separate ships, or destroy them if they approach near, requires projectiles with charges of over one hundred pounds; we being only able to expect, from what we have seen, very small operations by means of boats which can approach vessels of war and surprise them.

According to THE JOURNAL OF THE MILITARY SERVICE INSTITUTION, although the use of high explosives has not appeared impossible in artillery, it is not to be recommended on account of their sensibility to violent shocks.

A French periodical, *The Yacht*, dedicated exclusively to marine matters, believes that high explosives in shells are impracticable, and that they are not superior to those cominonly in use for that purpose, as much by their inefficacy as by their being a permanent source of danger with their premature explosions. It says that the English have made trials and are persuaded that it cannot be employed in war, and that what has been told about it is American exaggeration entirely in the character of mercantile reclamation.

* A good catapult, constructed in accordance with Mr. Jamotte's ideas, would no doubt go far towards solving this problem. And in siege operations it would be unquestionably efficacious to organize a corps of dynamiters, each man being his own catapult, and carrying the necessary appliances in his hat.—TRANS.

† Such projectiles, for this purpose, have already been made in the United States.—TRANS.

After the things presented to view, forming the general picture which precedes, the essential conditions of high explosives, their manner of conducting themselves as such, the experiments to which they have been submitted on the proving ground, and the opinion of intelligent persons and of the Press, the insignificant judgment of the subscriber could be well excused. Nevertheless, we well permit ourselves a few words.

Already we have seen that the same properties, which we talk about utilizing in dynamite, are identical with those which oppose its use, and this opposition is the more accentuated as those qualities are more intense, because, in fact, the potency of the explosive marches parallel with its sensitiveness. And, to overcome this in the piece, up to this date all efforts have been directed, with the desire at the proper time to utilize it to the best advantage against the target.

From this are derived two classes of investigations and experiments—the one directed to the mode of firing, and the other to that of destroying the object upon which we fire. Both things are joined for decisive effects: compounds very active and in great quantities are required against the target, and necessarily the development of such conditions favors the premature detonations of the charges of the projectiles from the effect of the discharge of the gun. On the other hand, as the charge of the gun is greater, by reason of the distance it is necessary to throw the projectile or the velocity we must communicate to it, more efficacious also will be the injurious effects of the discharge cited.

The problem is confined between the two extremes expressed, and, up to date, it has not been solved, nor is there any likelihood that it can be solved while no other road is followed. The experiments we have reported being analyzed, we see that they have not been able to employ explosive charges sufficient for the destruction of ships, nor have they been able to propel projectiles by means of charges of projection adequate to the ranges and velocities which the projectiles demand in order to be useful. We have seen, besides, that the action of high explosives against plates is much inferior to what was imagined, considering its properties, and, if we must give credit to the report of the experiments, the quantity necessary to sensibly injure ships cannot be contained in the projectiles commonly used; and although this would be mended greatly by penetration, there are two difficulties, seemingly insuperable: 1st. The excessive* velocity which must be impressed upon the projectile, the discussion of which we have just finished; 2nd. That, up to date, the dynamite has always exploded on impact, which makes penetration impracticable. This, † apart from the peculiar and natural difficulties attending firing for perforation.

*Señor Carrasco seems to be much impressed with the idea of "excessive velocity." To insure the necessary penetration we must, of course, start with a *good* initial velocity, and this is what we expect to get from a good modern gun, steel projectiles, and improved modern powders now in use.—TRANS.

† Here he is greatly in error. Penetration will undoubtedly take place in wrought-iron plates when *uncamphorated explosive gelatine* is used. This is a matter of record in the United States when eight-inch shells, with solid *cast-iron* ogival heads, were fired from a rifled gun with thirty-five and forty pounds of hexagonal

Certainly the perfect realization of the plans which have been traced, with dynamite for a foundation, would be an admirable thing, capable of changing the principles of war, and inferior only to aërial navigation; but, admitting that it may not be impossible, to-day it is found in the period of tentation, and it would be a vain pretension to think of mastering this subject without departing from the beaten road. Only an extraordinary conception, an inspiration of Creative Genius, excited by the obstacles of war or by the stimulus of interest, will give the solution some day when it is least expected.

We could reproduce in Spain the experiments already known and arrive where the others have arrived, having to stop there as they have stopped, which would in no way advance the question. It would be better to open a contest among the officers of the corps, or of the entire army, offering an actual reward to him who might have the ability, or the good luck, to solve the problem.

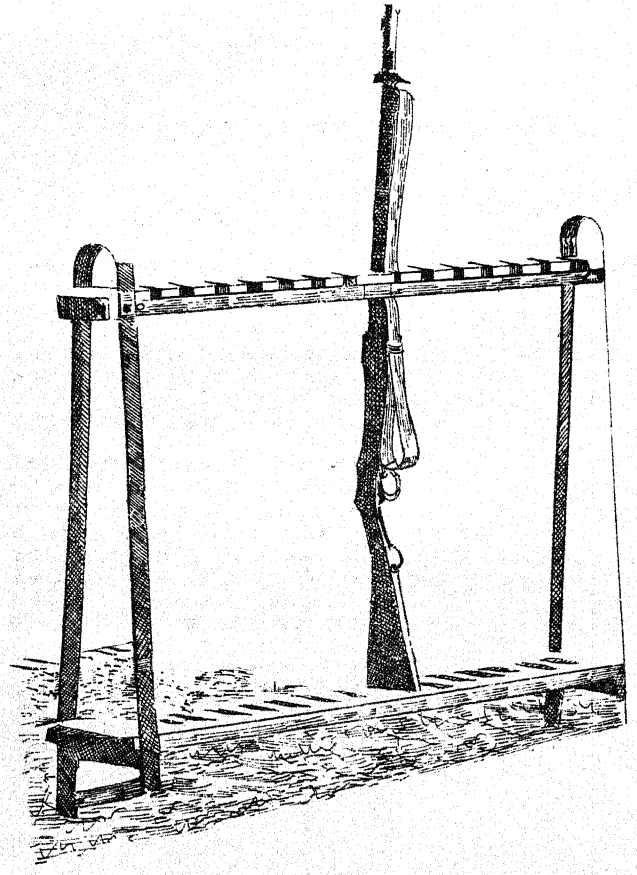
Nevertheless, it would be useful to undertake some experiments which would confirm the most important already made, and demonstrate the possibility or impossibility of success. Dividing the question as it stands into action upon the target and mode of firing, and sub-dividing the first part into effects with penetration and without it, perhaps we would be able to arrive at conclusions of some value.

First, we must determine to commence upon the effects without penetration, or in contact; then, if the explosion is verified always on impact or in the rebound after impact, it is idle to occupy ourselves with penetration. In order to verify the experiments on explosions in contact we could conveniently dispose a target plate, and cause to detonate, suspended against it, free charges of dynamite equivalent to those which the ordinary projectiles carry; and, if any charge cause appreciable damage, repeat the operation, separating it from the target small distances, say from 0·02 to 0·10 metres (0·79 to 3·94 in.) to observe the influence of distance. Afterwards another trial could be made, similarly, with the dynamite enclosed in corresponding projectiles. If the results were *nil*, further effort in this direction could be excused, and there would remain demonstrated the absolute necessity of penetration, it devolving upon us then to acquire the certainty of whether it is or is not attainable. Here now comes the part relative to firing.

The programme would be to fire shells charged with dynamite against the target, increasing the velocity until they burst from the shock, or until they penetrated. If the account of experiments made is true, there would be no necessity of going to this extreme, and the impossibility of penetration would remain proved and, at the same time, that of the application of dynamite to the charge of projectiles; and, in the expectation of this catastrophe, we could make use temporarily of pieces

powder. And the penetration was as great as the gun was in the habit of giving when no bursting charge entered the projectile. The shells were weak at the line where the ogival heads were screwed on, penetration took place up to, or near to, this circle, and that is precisely where they broke. Suppose the gelatine had been *camphorated* to that extent, only to be determined by experiment, which would render it most stable, and the projectiles had been of steel of improved pattern?—TRANS.

of small calibre, which would offer greater facilities. In the contrary case, *viz.*, that of penetration, the entire problem would be solved, since, on obtaining it, we would have overcome all the difficulties concerning the firing. And if, before attaining penetration, or explosion on impact, the guns burst, conformably to what has happened up to date, we must seek for pastures new. It is understood that for the last part of the experiments, where firing is required, it is necessary that we should receive more exact information from the aforesaid Snyder system, and models of the apparatus which this inventor has used in the United States.



NOTICE OF INVENTIONS.

SAFETY ARM-RACK FOR FRONTIER STATIONS.

By Sub-Conductor J. McDERMOTT, *Quarter-Master-General's Department.*

OBJECTIONS have been made to the existing pattern (Oxenden) Arm-rack for frontier stations, on the score of damage caused by the iron bar which is passed through the trigger guards to secure the rifles.

Three new patterns have, therefore, been recently designed and reported on by a Committee.

The pattern approved by the Committee, which is shown in the accompanying sketch, was designed by Sub-Conductor McDermott, clerk in the office of the Quarter-Master-General in India. It can be fixed either on a bracket let into the barrack room wall, or on standards secured to the floor. The rack should be, in either case, about 30 inches from the butt-rest, in order that it may receive the rifles just above the lower band.

For carbines it should be lower, so as to take the carbine between the backsight and lower band.

The weapons are kept in their places by two bars which meet in the centre, and are secured by a lock which is placed in the middle of the rack.

The racks on standards can be removed to standing camps, and be secured to the tent poles with chains.

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GOLD MEDAL ESSAY, 1886.

BY LIEUTENANT A. C. YATE, *27th Bombay Light Infantry.*

THE FORMATION OF A RAILWAY SERVICE CORPS FROM THE NORTH-WESTERN RAILWAY.

MOTTO:
"Take time by the forelock."

ON the 10th of October, 1884, Colonel (now Major-General) Chapman, R.A., C.B., A.-D.-C., delivered at the United Service Institution of India a lecture on the "Employment of soldiers in civil life after the performance of meritorious military service." This lecture was published in the 61st No. of the Journal of the United Service Institution of India; and in two letters reprinted at the end of that No. occur the following paragraphs:—

"I look forward to the establishment of soldiers, both European and native, who have performed meritorious service (for whatever period may be determined on) in subordinate positions throughout the State Departments under the Government of India, and I anticipate that * * * we shall secure for native officers, non-commissioned officers and soldiers places of trust throughout the State Railways * * * and in many other places where, when the frontier is threatened, and the active army is in the field, they may add to the confidence with which the Government must necessarily leave large tracts of country and long lines of railway unprotected by organised military bodies.

"A suggestion is now being made to allow the second class army reserve of the British army to reside in any portion of the Empire. Such soldiers are pensioners, and native soldiers, after service, would stand on the same footing as the second class army reserve of the European army.

"In considering the question of reserves, it appears to me that the only way in which natives will understand their obligation to bear arms, after they quit the active army, is by the introduction of a regular plan of embodiment for pensioned soldiers who remain in Government service. * * * * An extension of frontier railways may give us a military railway service in which our duffadars and havildars would be station masters, and our native officers compete with staff sergeants of British regiments for appointments in the Traffic Department.*

"If we are content to establish a system of continuous Government employ, and to pass men from the army into the various departments of the State, placing them not only in the very lowest grades but in all positions, we may establish a contented body of Government servants in every province, retaining to some extent the associations of their previous military history, trained to bear arms and distinctly loyal to the State. That such men can be readily embodied, and can be made available for the protection of railways, of public buildings and property in large stations and to relieve the fighting line, will, I think, be accepted.

"If the idea of allowing British soldiers of the second class army reserve to reside in any part of the Empire be accepted, we shall again be able to offer to men, who have selected a military career in India, the chance of honorable employment when they pass to pension and a career in civil life in this country. The certainty that the ability to hold the country, as we have so long done, depends very largely on the presence, in every part of India, of Englishmen in every class, who, whatever their position or employment, recognise that they have an individual responsibility in maintaining the British rule in India, is a matter of history."

It appears to me that the above-quoted remarks by General Chapman contain, with some modifications, the germ of the "formation of a railway service corps from the North-Western Railway." The modifications that I would suggest are that—(1) not only the second class but also the first class army reserve be permitted and encouraged to accept, on the completion of their service with the colours, employment on the Indian State Railways, and in particular on that railway which is so important to the safety of the Indian Empire, the North-Western State Railway; (2) that the employment of native reserve soldiers be carried out in conformity with the proposals for the formation of native army reserves now before the Government of India; and (3) that the officers, non-commissioned officers and men of the North-Western Railway Service Corps should not be civilians but soldiers, and as such in all respects subject to military discipline and law, and, at least, in time of war under the orders of His Excellency the Commander-in-

* I cannot say that my experience of native officers, duffadars and havildars leads me to consider them, as a general rule, fitted for such appointments. They are much better qualified for practical than clerical work.—*Author.*

Chief in India and available for any duty that the exigencies of war may entail on them.

Before entering on a statement of the terms of service of the British soldier, and the alterations now proposed in the conditions of service of the native soldier, and a discussion of how they may be made conducive to the formation of an efficient railway corps for service on or near the North-West Frontier, I think it not out of place to draw attention to the importance now attached to the maintenance in time of peace of organised railway corps by all the great military powers of Europe by giving a brief account of the German, French, Russian and Austrian railway corps, especially as valuable hints may be obtained therefrom for the formation and organisation of the railway service corps on the North-Western Railway.

Continental railway service corps.

(1). The German.

It appears that, like many of the more recent innovations and improvements in military organisation, the conception, or at least the practical adaptation of the conception, of a military railway corps emanates from the German or, I should rather say, Prussian War Office. To quote Captain W. A. H. Hare (Royal U. S. I. Journal, No. CXXXII, p. 1186, seq.): "The first formation of military railway troops was made in the war of 1866, when field railway detachments were put together on mobilization for the first time, and formed chiefly of civilian railway servants and artificers and, to a small extent, of men of the Pioneers. After the war of 1866 the military element in these detachments was increased, but technical matters still remained in the hands of civilians, and it was not until the year 1871—that is, after the experiences of the Franco-German struggle—that a permanent military railway corps was formed. By a decree of the 19th May of that year a railway battalion was created at Berlin, consisting of a battalion staff and four companies, with a total peace strength of some 500 men. In December, 1875, an additional battalion was created, and the two formed, with a regimental staff, into a regiment of eight companies." Major J. S. Rothwell, R.A., writes (Royal U. S. I. Journal, No. CXXXIII, p. 325): "It is stated that it is the intention of the German Government to double the strength of the railway troops and form a brigade of two regiments." There is also a Bavarian railway company, strength 6 officers and 159 non-commissioned officers and men, stationed at Ingoldstadt. The peace establishment of the Prussian railway regiment (two battalions) quartered at Berlin is 53 officers and from 993 to 1,001 non-commissioned officers and men. The officers are taken partly from the engineers and partly from the infantry, but only to a very small extent from the latter. The non-commissioned officers and privates are selected from men employed on or connected with railway work, such as guards, engine-drivers, platelayers, engine-fitters, shunters, pointsmen, &c.

The officers and men of the railway corps wear the uniform of the Pioneers of the Guard with the letter E (Eisenbahn) on the shoulder-strap in yellow (gold for the officers). The men have the same arms

and equipment (shovels, picks, axes, hatchets, &c.) as the Pioneers. The German Pioneers are armed almost exactly like the infantry.

The instruction and training of the railway corps consists of—

(1). Traffic management in all its branches.

(2). Construction, repair and demolition of lines.

Under the latter heading is included the construction, repair and demolition of all works connected with railways, such as bridges, tunnels, embankments, stations, permanent ways, rolling stock, signals, tanks, and cisterns, beside the laying, repairing and working of telegraph lines. Detachments of the railway regiment are often employed in the construction and maintenance of lines of railway belonging to the State or Private Companies. The men work under their own officers, and receive extra pay from the railway authorities.

On mobilization the railway battalion is broken up into—

(1.) Companies of Railway Artificers.

(2.) Railway Traffic Companies.

(3.) Companies of Railway Workmen.

The railway regiment would probably furnish at the opening of a campaign 8 Artificer, 4 Traffic and 2 Workmen Companies, being made up to war strength from men of the reserve and Landwehr who had previously served in it. The Bavarian corps would mobilize one Artificer and one Traffic Company. The Artificer Companies take the field with troops of the first line, and, as circumstances require, construct, repair or demolish lines. The Traffic Companies manage the traffic in the immediate vicinity of active operations. The Workmen Companies are employed in the loading and unloading of trains and the storing of goods in railway depôts.

As regards reserve officers, the German Army List of 1885 gives 1 Captain, 17 First Lieutenants and 62 Second Lieutenants, or 80 in all. As regards men, the regiment takes annually 350 recruits, so that in course of time the 12 contingents (the German soldier serves 3 years with the colours, 4 with the reserve and 5 with the Landwehr except the Einjährige, or one-year men, who serve only one year with the colours and six with the reserve) will give it some 3,770 reserve and Landwehr men (deducting probable casualties) who will have passed through the regiment. But actually the reserve of the regiment comprises, in addition, all railway employés of every kind belonging to the reserve and Landwehr, no matter in what arm or branch of the service they have served.

The total number of men that would be available for the railway corps in case of war has been estimated at 20,000.

The strength of the several companies on mobilization is as follows :—

(1) Artificer Company—9 officers, 25 non-commissioned officers and 186 men, with a train detachment of 11 men, 16 horses and 5 wagons for conveyance of tools, appliances and telegraph gear.

(2) Traffic Company—6 officers, 41 non-commissioned officers and 170 men.

(3) Workman Company—2 officers and 202 non-commissioned officers and men.

A depôt of two companies would also be formed at Berlin, strength 16 officers, 85 non-commissioned officers and 325 men, besides about 100 regimental tradesmen.

As the French, Austrian and Russian railway corps are organised on very much the same system as the German, it is unnecessary to do more than give their strength, arms and equipment and note any distinctive points.

(2). The French.

Until July, 1884, the French railway corps consisted of only four companies (peace strength of each, 4 officers and 122 non-commissioned officers and men) or one to each regiment of engineers. Still so alive were the authorities to its insufficiency to fulfil the requirements of a great war that the six great French railway companies were called upon to furnish in case of war eight field sections of railway artificers, workmen, &c. Each section was divided into three divisions for work connected with the traffic, line and rolling stock and engines respectively. Each section numbers 1,165 men, *i.e.*, 459 for traffic duties, 429 for work on the line, and 277 for work connected with engines, rolling stock and *matériel* generally. The *personnel* of these sections were bound to wear a special uniform as soon as the army was concentrated. However this semi-military arrangement was seen to have many defects, not the least of which was that, until mobilization, these sections existed only on paper. In July, 1884, the 20th battalion of French Engineers was converted into a 2nd battalion of railway workmen, and the French railway corps was thus increased to eight companies (peace strength), thus placing France in this respect more on a par with her great military neighbours. At the same time some few years must elapse before France can possess a large reserve of trained railway employés for use in time of war.

(3). The Austrian.

Austria has a "Railway and Telegraph Regiment" of—in peace time—two battalions of four companies each. The total peace strength is 45 officers and 844 non-commissioned officers and men. But in case of war all the men of the reserve and Landwehr who have passed through the regiment, or who, having served in other branches of the army, have been employed as railway officials and servants, are drafted into it, and it is then broken up into the following units :—

(*a.*) 8 railway companies, total strength 40 officers, 1,784 combatant and 160 non-combatant non-commissioned officers and men.

(*b.*) 46 field telegraph detachments, total strength 46 officers and 2,302 non-commissioned officers and men.

(*c.*) The depôt battalion consists of 15 officers and 378 men.

The reserve of officers for this regiment is formed, in the first instance, of officers and one-year volunteers (Einjährige) who have passed through the regiment ; and, secondly, of officers of other branches

of the service, or of the Landwehr, whose professional attainments fit them for doing duty with the "Railway and Telegraph Regiment." Lists of such officers are kept in the department of the general staff.

The combatant non-commissioned officers and men are armed with the Werndl Carbine, with bayonet and pioneer's sword, and carry respectively 20 and 30 rounds of ammunition apiece. The uniform is that of the Pioneer regiment with a distinctive badge on the collar.

The railway companies and telegraph detachments on a war footing have a field equipment of railway and telegraph tools, appliances and stores complete. The field equipment of the railway companies is kept in store at the head-quarters of the regiment, and in war would be partly carried by the men and partly in wheeled transport, or in railway vans or trucks. The field equipment of the field telegraph detachments is kept, in peace, on specially constructed wagons, that of the mountain telegraph detachments ready for placing on pack animals.

(4). The Russian.

The five battalions of the Russian railway corps are a portion of the engineers. The strength of each battalion is 24 officers, 900 combatant non-commissioned officers and men, and about 50 non-combatants. Their arms and equipment are the same as the Russian infantry, and, apart from technical work, they are drilled and trained just like infantry. Each battalion is provided with a complement of engineering tools. It would appear that the duties of a Russian railway battalion are rather those of construction than traffic management. Two of these battalions, if not more, are now engaged on the Trans-Caspian Line. The progress of these Russian railway battalions have a very vital interest for India; and, as the North-Western Railway Service Corps may be regarded as their rival, the following quotation descriptive of their method of and capacity for work is not out of place.

"The *Russki Invalid* gives some interesting particulars concerning the newly-formed 2nd Trans-Caspian Railway Battalion. This battalion commenced work on July 1st, 1885, when three companies were put on the earthworks and one company on the laying of the sleepers and rails, with the exception of such among them as were skilled workmen, blacksmiths, locksmiths, &c., these being assigned to the different workshops so as to increase the *personnel*. At first, on account of the earthworks not being sufficiently prepared, the laying of the line was performed by small parties, as of instruction, but by order of the constructor of the line the numbers were soon increased. The company employed to lay the rails was now housed in railway carriages, in which the officers and attendants also lived, and these carriages formed a train which moved along every day according as the line was laid. Thus on September 10th the road had reached Bami, a distance of 34 miles, and by this time the train contained two companies of the battalion, a still comparatively weak force. When the line reached Archman, 54 miles from Kizil-Arvat, another company was added to the layers, the duty

of this latter company being to prepare the line on ahead with the material brought together by a special transport train consisting of carts, to which horses or camels were harnessed. On November 14th the Geok-Tepe station was opened, and from the 17th of that month the three companies, comprising altogether 450 men, were definitely established in the 'laying train.' By this time it was found possible to augment the means of transport, material being brought by horses procured in Russia. With this force the work advanced at the rate of nearly three miles a day, and the whole distance from Geok-Tepe to Ashkabad (28 miles) was completed between November 17th and 29th, which, after allowing for two holidays, makes an average of almost three miles per diem. This rapid progress of the line on such a broad scale has a tremendous significance in regard to military railways, and has proved that such quick work is possible in war time, too, if the matter be properly organised and on a military footing. At the present moment the line has already reached Dushakh, distant about 241 miles from Kizil-Arvat, and goes straight on to Merv. The 'laying train,' in which the three companies live, consists of 27 two-storeyed carriages, specially arranged for living in, the interior being lined with thick felt for the winter, and provided with stoves, windows, steps and sleeping berths. There are also in these carriages kitchens, depôts, store rooms, locksmiths' and joiners' shops, a hospital, chancellery and telegraph. The officers likewise live in the train, having a separate carriage for their mess and a private kitchen. In a word, the 'laying train' represents a movable barrack, in which, for now more than half a year, lives in the depths of Asiatic steppes a whole corps, fearlessly and steadily advancing a little every day, and leaving behind it a railroad and telegraph line, which connects solidly and for ever the distance traversed with European Russia. The 2nd Trans-Caspian Battalion has only now (June, 1886) got to lay about 100 miles to reach Merv. The Caspian Sea is already nearly 585 miles distant."

How far object of Indian railway corps differs from that of the Continental ones.

There are certain points in the organisation of Continental railway corps which will be of use in considering the question of the formation of a railway corps from the staff of the North-Western Railway. But at the same time we must bear in mind that the primary object of the Continental and Indian railway corps is not identical. The former would at the commencement of a campaign be occupied in securing the free and uninterrupted passage of troops and *matériel* to the scene of operations. Its subsequent *rôle* would depend (presuming that the first collision took place on the mutual frontier of the two contending powers) on the good or evil fortune that attended the armies of the nation to which it belonged. If successful, it would have to repair lines partially destroyed by a retreating foe. If unsuccessful, it would have to do all in its power to demolish lines in the face of a victorious enemy. Such at least are the duties of artificer companies. The Traffic and Workmen Companies are at all times, by the nature of their duties, employed in rear

of the scene of operations. The primary object of the railway service corps of the North-Western Railway is the working of the line in all its branches, and the security of such portions of the line as run through tracts of country that are inhabited by turbulent tribes who are as yet more or less unsettled and unreconciled to the rule of the Indian Government. Such for example is the portion of the line from Sibi *viâ* Harnai and Kach to the Pishin, and such might be the line from Rindli *viâ* the Bolan to Quetta. The outbreak among the Marri and Pathan tribes, on the former line that ensued on the evacuation by our troops of the Harnai route, consequent on the defeat of Maiwand in July, 1880, is an instance of what might recur at any time in the immediate future. Only so recently as last year a scare broke out among the employés on the Sind-Pishin Line now under construction, and many of them deserted their posts. The formation of a railway service corps from trained soldiers of the reserves, both British and native, may be made conducive to the prevention of the recurrence of any such scarces—scarces that in the time of war and external danger to India might be disastrous if not fatal. In the event of any attempt on the part of Russia to invade or even threaten India, the occurrence of a panic on the lines of railway that would feed and supply our army of defence would be most inopportune. But while the primary object of the railway corps would be the satisfactory working of the line and its defence from internal danger, it is also quite possible that it might be called upon to furnish railway artificer companies for the rapid construction of a line or lines of railway for strategic purposes, as, for instance, a line from the Pishin or the Khwaja Amran range to Kandahar and Girishk, or from some point on the North-Western Frontier towards Kabul, or across the Beluch desert to the Helmand. As the construction and management of telegraph lines is also intimately connected with that of railways, and as in modern warfare telegraphic communication is essential to the success of military operations, I hold that a certain proportion of the staff of the North-Western Railway Service Corps should be trained as telegraphists both for working and construction. The Austrian military authorities have deemed railways and telegraphs so inseparable that they have united the two in one corps; and in the German and Russian railway corps telegraphy is not overlooked. Hitherto, whenever war has been carried on out of India, the Director of Telegraphs in India has been called upon to furnish the telegraph staff requisite for the conduct of the intended military operations. Now I am not aware that the strength of the staff under the orders of the Director of Telegraphs is calculated to meet any such demand, and therefore I would suggest that, in view of the extensive military operations that we may at any time be called upon to undertake on the North-West Frontier of India, we should organise from the staff of the North-Western Railway not only a railway but a telegraph corps. To form the latter from the reserves of the

Telegraph branch of railway corps.

British and native armies is as easy if not easier than to organise the former. The number of British non-commissioned officers and privates employed and trained in the telegraph offices in India is very considerable,* and there is every ground for supposing that with reasonable inducements they would readily accept service in the Telegraph Department of the North-Western Railway. In the event of Russia attempting to invade India, it seems probable that a force of, say, two army corps would be massed on the line Kabul-Ghazni-Kandahar, and it would be advisable, if not imperative, that not only should Kabul and Kandahar be connected by telegraph with Peshawar and Quetta but also that a telegraph line should be laid from Kabul through Ghazni to Kandahar. Although probability points to the Herat-Farah route as the probable line of a Russian advance, it is nevertheless impossible to say where the chief attack would be made. It is important that the British forces at Kandahar (or rather on the Helmand near Girishk) and at Kabul should be able to concentrate rapidly on the threatened point, and nothing can facilitate that so much as telegraphic (combined with railway) communication. Therefore I consider that the railway corps of the North-Western Railway should include an efficient staff of telegraphists, trained both to lay with rapidity and to work a telegraph line. Any one who has seen the telegraph lines laid in Afghanistan during the late war of 1878-80, or the lines worked by the Persian Government, is aware that a systematically dry climate materially facilitates telegraphic construction. Insulators are a superfluous luxury. I have seen lines carried from boulder to boulder, and even in the damp climate south of the Caspian I remarked that broken insulators did not seemingly interfere with the transmission of messages. Consequently the rapid construction of a temporary line of telegraph is an easier matter in the dry climate of Asia than in the more humid one of Europe.

Mounted branch of railway corps.

I would also suggest that it would be advantageous to instruct our native cavalry in the construction, repair and demolition of railways and telegraphs. Captain Hare states that every year the German railway regiment sends a detachment to the School of Cavalry at Hanover to give a course of instruction in such work. But supposing that our cavalry could not be spared for such duties, or even with a view to assisting and co-operating with them, it seems desirable that a portion of the railway corps of the North-Western Railway should

* The following figures have been obtained from the office of the Director-General of Telegraphs in India :—

Number of soldier signallers under training during the first half of the year 1886	274
Number of soldier signallers qualified and granted certificates during the first half of the year 1886...	135

A considerable number of soldier telegraphists are now employed in the Indian Telegraph Department, and the corps of Royal Engineers can furnish a good many more, especially well-educated and able non-commissioned officers.

be equipped and trained as a mounted corps. The details of this equipment and training will be treated more fully further on.

Quotations from Continental writers on the importance of a good railway service in time of war.

As a guarantee of the necessity for the formation of a trained railway service corps on the North-West Frontier I may quote one or two extracts from the writings of Continental authorities on the subject. Baron von Weber, State Director of the Railways of the Austrian Empire, says: "Nothing can be more advantageous for the effective utilisation of railroad establishments in time of war than the arrangement that their methods of conducting business in time of peace, the system to which they are accustomed, and which is familiar to their *personnel*, should require as little modification as possible in time of war.*"

Colonel Hennebert, in the preface to his work "L'Europe sous les Armées," says: "The great difference in the system of massing large armies now-a-days, and that formerly resorted to, is entirely owing to the use of railways and to the fact that the existence of railways obviates the necessity for the lengthy preparations that were necessary in bygone days before a blow could be struck. Railways enable armies to be rapidly changed from a peace to a war footing, and woe betide the army that is backward in this operation; it may be almost said its fate is sealed. This being a fact beyond dispute, there is again the enormous use of railways in rear of an army in the course of operations, admitting that the army has been enabled to change from a peace to a war footing, concentrate and take the field without a hitch or check. The immense scale on which war can be carried out, and the wants of an army supplied from home or other sources, is again entirely owing to the use of railways, and this is a second fact equally beyond argument." "This work of supplying the wants of a large army in the field requires," says von Goltz in his work 'Das Volk in Waffen,' "endless labour, a perfect knowledge of the work and immense resource. Duties of the kind can only be expected from a disciplined body recruited and organised as a military force and perfectly trained with great care beforehand in peace."

* It may be remarked that the amalgamation of the Sind, Punjab and Delhi, Indus Valley and Punjab Northern Railways with their branch lines under one, *i.e.*, Governmental management, is a step in attaining the desired uniformity in time of peace. It still remains to organise a military railway corps for the management of the Bolan and Sind-Pishin Lines, including perhaps the Ruk-Sibi section. At any rate it seems most necessary that the last-named section should be made a double line rather to enable it to carry on the troops, stores and *matériel* that would be poured in at Ruk, both from Karachi and Lahore, than because the carrying power of the Ghât lines is so very great. It should, however, be borne in mind that a new and easier route for the Quetta Line than that *viâ* the Bolan has been discovered and, I understand, surveyed. Any line that could avoid the very steep gradient between Dozan and Darwaza would greatly increase the carrying power of the railways that connect or are to connect Sind with the Pishin. It is also desirable that large store sheds and accommodation for the temporary shelter of troops should be prepared at Ruk. When troops are being concentrated and stores collected there both from the north and south there is certain to be delay.

Now although as yet the position of Continental armies to each other in this respect does not find an exact parallel in India, still it is quite clear that the time is drawing nigh when the British Power in India will be relatively situated towards the Russian Power in Central Asia (and probably also to the French Power in Tonquin) as one Continental nation is to another. Both India and Russia are now busily engaged in pushing forward their railways to the frontiers of Afghanistan, and no one can with certainty foretell when these two railway systems will meet on a common frontier. Foreseeing this we should prepare accordingly, and have a thoroughly organised system of railway service that will enable us to rapidly mobilise and concentrate our forces at the required point, and furthermore supply them throughout the campaign with food, stores, material and reinforcements.*

The altered situation of India as regards foreign powers.

It is no argument against this that, at the present moment, the forces detailed to defend India can be massed on the line they are intended to hold long before Russia could concentrate her troops to attack them. What is now the case will certainly not be so a few years hence. We have seen the Russian frontier advance since 1880 from the Caspian on the West and Khiva on the North to the Zulfikar Pass, Chaman-i-bid, Maruchak, the frontiers of Maimana and Andkhui, and the neighbourhood of Kilif on the Oxus. In the course of eighteen months more the Trans-Caspian Railway will be carried across the Oxus to Bukhara,† and no one knows when branch lines may be constructed southward along the valleys of the Kushk, Hari-rud or Murghàb, if indeed the valley of the Keshef-rud be not

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* A few figures from Mr. David Ross' "Military Transport by Indian Railways" will give some idea of what will be required of the North-Western Railway in case of war with Russia. The force placed on the Kabul-Kandahar Line will probably be two army corps, *i.e.*, about 60,000, which is approximately the number of troops serving in Afghanistan and on the communications during the latter part of the war. According to Mr. Ross the gross military traffic booked under Government warrants during the Afghan war of 1878-80 was—

538,364 troops and followers.
114,156 horses, ponies and mules.
15,477 bullocks, 479 guns and artillery and engineers' carriages.
8,645 camels.
148,889 tons of Commissariat, Ordnance and Military stores.
93,099 tons of material for frontier railways.

These required an estimated number of 2,023 trains, 785 of which were special troop, live stock and material trains.

The great number of troops and followers is explained by the fact that each separate despatch is reckoned as a fresh departure. On an average each man has been counted about three times, so that the actual number of men conveyed during the war would be under 200,000.

For some time about 60 trains entered and left Lahore Station daily, and this on single lines of railway. The stores booked under Government warrant were only a small portion of the real amount used by the Afghan force as most of the Commissariat stores were booked by private traders.

† The Trans-Caspian Railway was opened to Merv on 13th July last.

preferred. This being so we cannot prepare too soon to cope with the invader. The frontier of India in fact, as has been repeatedly pointed out of late, will probably ere long march with that of one of the four great Continental military powers, and if she would then be in the same position as a Continental Power, she must adopt the recognisedly best system for working railways efficiently for purposes of war.

What I have written above is for the purpose of showing (1) the system of military railway service now generally adopted by the four great military powers of Europe; (2) that that system, if not absolutely at the present moment applicable to India, will in all probability be so within a period that may be certainly measured by *lustra*, if not by years; and (3) that India possesses a source from which an efficient railway service corps may be formed. Due weight should also be given to the consideration that any augmentation of the strength of the British forces in India is an additional security to the Empire; and in no direction can such security be more opportunely applied than in the protection from malcontents and rebels of those lines of railway communication, which are one of India's great safeguards alike from external invasion and internal rebellion. The formation of a railway service corps for India is by no means a new idea. It has been on the *tapis* certainly since 1864, when Sir William Mansfield,* then Commander-in-Chief of the Bombay army, wrote a minute on the subject. The conditions of service in the British army have been so modified since 1864 that the main objection that presented itself to Sir William Mansfield, *viz.*, the denudation of the army of some of its best men for the benefit of railways, no longer exists. Now, after seven or eight years' service with the colours, the majority of soldiers are drafted into the first class army reserve, and take civil employment wherever they can find it. It is obvious that the employment of the pick of these men in a service so essential to the security of India, and the efficiency of its army as the North-Western railway service corps, is more advantageous to Government than to allow them to take civil employ under private masters. There are, however, several points on which Sir William Mansfield dwells that are as applicable now as then. He in particular directs attention to the fact that soldiers are continually soliciting discharge for the purpose of engaging in railway employ, and that the railway authorities are anxious to secure the services of experienced respectable men fit for railway purposes having a knowledge of the country and good health. It stands to reason that, if soldiers were eager and fit for railway service then, they are equally so now; and the objection that suggested itself then to Sir William Mansfield, *viz.*, that soldiers engaging in railway service forfeited their claim to pension after 21 years' service, need not apply under the present short service system. The following remarks made by him are as applicable now as in 1864:—

The late Lord Sandhurst on a railway service corps for India.

* Afterwards Lord Sandhurst.

"With respect to our military tenure of India, and the highly artificial circumstances in which the small numbers of our countrymen maintain British dominion over 150 millions* of an alien population, a not inconsiderable advantage may be discovered in the fact of having military subordinates in employment on Indian railways. In the case of local or general commotion, the necessity for putting railway stations in a state of defence, and organising the resources of railway companies in aid of the troops, would not fail to show itself. It is evident that, in such circumstances, a great advantage would be found if the railway guards and others of like rank should be all trained to arms, and bound to obey military orders exposing them to danger of life and limb. It would not be possible in the most dangerous times to alienate such servants from their proper duties on the railways, for the latter, besides being wanted for the community, are amongst our most important and formidable resources for the suppression of rebellion and internal tumult. But times will occur when the defence of a station may be matter of prime necessity till aid can come, and when the old habits of the use of arms and of acting under orders for the combination of defence may be of almost immeasurable importance. It seems then, if no other advantages presented themselves to notice in the system I advocate, that the single one shown in the facilities for welding, as it were, the railway system with the means by which the country is held is so important as almost to carry with it the conviction that the system should be adopted in practice." It will be remarked that Sir William Mansfield regards the employment of soldiers on railways solely as a measure of defence against *internal* disturbances. We must remember that he was writing within six years of the Mutiny, and that in 1864 Russian arms had made but little progress east of the Caspian, while the French occupation of Tonquin and the consequent British annexation of Burma could scarcely have been foreseen. In 1886 the formation of a railway service corps is necessitated even more for the repulsion of external attack than the suppression of internal disturbance. We are now considering the formation of a railway corps for service on the North-West Frontier of India, but it may not be long before we may have to form one for service on the Eastern Frontier.

In 1864 Sir William Mansfield proposed to draw railway employés from the British army and to place them on an unattached list. But he had no other object in view than the better management of the railway service and the security of railways from the results of any internal commotion. In 1886 I propose to form the North-Western railway service corps (a corps that is an important factor in the scheme of defence of our North-West Frontier) from three sources, firstly, the existing European staff of the North-Western Railway, many of whom are already enrolled in the 3rd Punjab Volunteer Rifle Corps; secondly, from the first class reserve of the British army; and, thirdly, from the native army reserve, the formation of which is now

* The census of 1881 gave India a population of 250 millions.

under consideration. Furthermore, there seems no reason why native employés of the North-Western Railway of good physique and belonging to a fighting class should not be enrolled in the ranks of the railway service corps.

At present all soldiers of the British army who have completed their army service and pass into the reserve are obliged to return to and reside in the United Kingdom. Before, therefore, soldiers of the reserve can be enrolled in the railway service corps, the sanction of the Imperial Government to their residing in India must be obtained. There seems no ground for supposing that such sanction would not be accorded.

We will now consider the several classes from which it is proposed to form the railway service corps and the conditions under which they can be enrolled.

Composition of the corps.

Firstly.—The existing staff of the North-Western Railway and the 3rd Punjab Volunteer Rifle Corps. The older European employés of the North-Western Railway are under no stipulation to become volunteers, and we may, therefore, look upon them as, in the main, not available for enrolment in the railway service corps. All the new European employés, one of whose written conditions of service is that they become and remain volunteers, are so available. Most of the present members of the 3rd Punjab Volunteer Rifle Corps would in all probability willingly enter the railway service corps. The present established strength of that corps is 850 of all ranks, with an adjutant for the battalion and one Sergeant-Instructor per company drawn from the regular army.* In this body of men we may consider that we have the nucleus of the North-Western Railway Service Corps, staff included. All its members are already more or less drilled and trained to the use of rifle and bayonet and habituated to military

(1.) From the existing staff of the North-Western Railway.

* The actual strength as per Return of 3rd July, 1886, is—

1	Commandant (Lahore).
2	Majors (Lahore and Sukkur).
1	Adjutant (Lahore).
10	Captains (there are 11 companies, but the company on the Multan-Montgomery section is at present without any officer).
13	Lieutenants (1 company has 3 Lieutenants, 22 companies have none).
1	Sergeant-Major (at Kotri).
1	Quarter-Master-Sergeant (at Sukkur).
10	Drill Instructors (from line regiments)
1	Bugle-Major (at Lahore).
11	Color-Sergeants.
2	Staff Sergeants.
33	Sergeants.
34	Corporals.
8	Buglers.
624	Privates.
Total 741.	Number efficient, 685.

discipline, besides being practically trained in the several branches of railway construction and management. In the course of some years the whole of the European staff of the railway would be included in the ranks of the railway service corps. As these employés, however, are under no stipulation to serve beyond the frontiers of India, it would be necessary to invite them individually to consent to serve on any railway work beyond the North-West Frontier which may have to be undertaken in connection with military operations. Reasonable inducements must be held out to them, *viz.*, that they should share in all the privileges attaching to the position of a combatant in the field, including distinctions, rewards, medals, batta, &c., and that they should, while so employed, receive extra rates of pay. These extra rates of pay would be fixed by the Government in communication with the Manager of the North-Western Railway, and as the occasions when this corps would be employed beyond the frontier would be but few, and then only in some very important campaign, it would be well worth the while of Government to offer liberal terms in order to secure the formation of an efficient railway corps in time of peace, when no expenditure would be incurred.

(2.) From the British army reserve.

Secondly.—The soldiers of the reserve of the British army. The terms of service of the British soldier are seven years' army and five years' first class reserve service. If a soldier is abroad when his period of seven years' army service expires, he is required to serve an extra year with the colours and only four with the reserve. Therefore every British soldier in India, unless in the meantime his regiment be ordered home, has to serve eight years with the colours. Having proposed that British soldiers of the reserve should be enrolled in the North-Western Railway Service Corps, it is, first of all, incumbent on me to show that they can be spared for such service. Since the year 1880 the net annual increases of the first class army reserve have been as follows :—

1881	...	3,959	men.
1882-83	...	10,504	,,
1884	...	4,697	,,
1885	...	2,603	,,

In the trooping season of 1883-84, 6,254 men were sent home from India to join the reserve. In that of 1884-85 only 3,504 were sent home, this decrease being due to the large number of men who accepted the bounty offered by Government for extension of service with the colours. A similar bounty was offered in 1883-84, but seemingly fewer men availed themselves of it than in 1884-85. Nevertheless, as we see from the figures above quoted, the number of men who joined the reserve in 1884 and 1885 greatly exceeded all the causes of decrease in its numbers in those years. On the 1st January, 1886, the strength of the first class army reserve was 41,889 as compared with 39,286 on 1st January, 1885, and 34,589 on 1st January, 1884, and this increase during 1885 has taken place, notwithstanding that out of 12,624 men who were entitled to pass into the reserve 4,745 elected to extend their service with the colours, so that the

actual contribution to the reserve was only 7,879, and yet despite this and the other ordinary or casual causes of decrease the net increase in 1885 was 2,603. The only argument against the transfer of soldiers of the reserve to the railway service corps is the fact that the first class army reserve is below its established strength. Its establishment, as voted in the army estimates of 1884-85, was on 1st January, 1886, 46,500, *i.e.*, 4,611 were wanting to complete its establishment. The excess in the second class and militia reserve on the same date was 1,478 men, leaving a net deficit of 3,133 men. In 1885, 39,971 recruits were enlisted in the United Kingdom, and the net increase in the strength of the army from all sources during that year was 11,921. Although it seems probable that the general depression of trade and agriculture during that year was a strong incentive to enlistment, still there seems no reason to anticipate that the returns of the Inspector-General of Recruiting will be less satisfactory in the current and following years.* If this prove to be so, then Government will be under no obligation to allow so many men annually to extend their service with the colours, and in that case the first class army reserve will in one or two years at most be raised to its established strength. The number wanting to complete the first class army reserve at the close of 1885 was 4,611, and the number of men who extended their service with the colours in that year 4,745. Therefore, had transfer to the colours been suspended, there would be no deficit. Moreover the number of men annually required for the Indian Railway Service will be but small†; and considering the importance of the service for which they are required, that small number may well be spared from the reserve.

It has been already stated that in 1883-84, 6,254 men and in 1884-85 3,504 joined the reserves from India alone, when the strength of the British force in India was probably under 60,000. For the current year (1886) the establishment of the British garrison in India is 69,862 (exclusive of officers), and of the garrison of the United Kingdom and Colonies 142,194. Consequently the former is as nearly as possible half of the latter, and its contribution to the reserve should be one-third of the whole. In 1885 the contribution to the reserve from the whole army was 7,879 (showing a net increase of 2,603 although 4,611 men were wanting to complete its established strength). Therefore the contribution due from the British garrison in India

* In July the following forecast of the recruiting for the current year was published :—

Recruiting for the army is going on very briskly, and among a superior class of men on the whole. It is anticipated that forty thousand men, the full number required, will be obtained. The proportion of educated recruits is steadily increasing, many gentlemen having enlisted.

† It is worth remarking that the present disability of Eurasians to serve in the British army may at any time be removed, and in that case there is no doubt that the Eurasians who enlist will, on the completion of their colour service and transfer to the reserve, have to reside in India. Many of them will be only too glad to be enrolled in a railway service corps. This is, therefore, another possible recruiting field for it.

would be $7,870 \div \frac{1}{3} = 2,626$. But even in the year 1884-85, when the number of men drafted from India to the reserve, *viz.*, 3,504, was unusually small, it was nevertheless 878 in excess of the requirements of an ordinary year. Now once the railway service corps is started, and recruited up to its established strength, nothing like 878 British soldiers will be required annually to fill up the gaps in its ranks.* There is yet another point that merits attention in connection with this question, and that is that there seems good reason to believe that at least a considerable proportion of the British soldiers transferred from the reserve to the railway service corps might be men with some previous railway training and experience. In support of this statement I will quote the figures of a Return furnished from the British forces serving in the Bengal Presidency in 1878. From that Return it appears that there were then serving in the British garrison of that Presidency the following number of men who had previously served in various capacities as railway employés :—

Guards	135
Engine-drivers	94
Shunters	116
Firemen	439
Cleaners and Stokers	263
Platelayers	357
Fitters	144
Artisans	74
Mechanics	189
Foremen	13
Signalman	1
Total ...	1,825

If in 1878 there were among the British troops in the Bengal Presidency alone 1,825 former railway employés, it is obviously probable that in 1886 there would be from one-third to one-half as many more in the garrisons of all three Presidencies. In 1885, as a result of the imminence of war with Russia during the early part of that year, the following increase of the British garrison in India was sanctioned :—

		Strength.
1	Battery Royal Horse Artillery	157
2	Batteries Field Artillery	314
2	Ditto Mountain Artillery	212
6	Ditto Garrison Artillery	690
9	Squadrons Cavalry (one to each regiment of Cavalry in India)	1,332
3	Battalions of Infantry, each 984 of all ranks, exclusive of commissioned officers	2,952
100	Privates to each of the 50 Infantry Regiments serving in India	5,000
	Total (exclusive of officers)	10,657

* According to the estimate given in the Appendix (List 1) the strength of European warrant and non-commissioned officers and privates in each battalion of the railway service corps is 165, *i.e.*, 495 for the whole corps. At a rough estimate 50 recruits per annum would suffice to maintain the corps at this strength, exclusive of the existing officials on the North-Western Railway.

This augmentation will be completed in the coming trooping season (1886-87). At the present moment the established strength of the British troops in Bengal is 42,600, and in Madras and Bombay combined 27,262. There seems very little reason to doubt that, with the requisite sanction of the Imperial Government, the European portion of the railway service corps could be recruited up to and maintained at its required strength from the ranks of the British garrison in India, and that, too, in the main, from men who had previously been railway employés in the United Kingdom. It may be not unreasonably surmised that men who had descended from the position of responsible railway employés to that of privates in the army must have shown themselves morally or mentally unfitted for the duties expected of them. Be this, however, as it may, the test that must be relied on is their conduct while serving with the colours for seven years, as reported by their commanding officers, and the experience of their character and fitness for railway employment gained during their period of probation, of which more hereafter.

Inducements to join railway service corps.

Having thus demonstrated that the reserve of the British army is able to furnish and spare the number of men required to form and maintain at the established strength the European complement of the North-Western Railway Service Corps, it remains to consider what inducements and advantages are offered by service in it. The following may be mentioned: (1) The superiority of pay in India to pay in England; (2) the certainty of permanent employment under Government and ultimately a pension, whereas soldiers of the reserve find great difficulty in obtaining civil employment in the United Kingdom, because employers object to engaging men who are liable to be called out for service in any national emergency; (3) the hope of attaining to high and lucrative appointments in railway employ, coupled with promotion to the warrant or commissioned grades. Such promotion should be open to those who are well educated and show themselves worthy of being entrusted with the duties of responsible posts. It is the reward to which non-commissioned officers of the unattached list employed in the several departments of the Government service look forward; and just as the officers of the 3rd Punjab Volunteer Rifle Corps are now selected from the higher railway employés so the officers of the North-Western Railway Service Corps should, with the exception of the military staff, be drawn from the higher European employés of the railway, such as managers, assistant managers, traffic and locomotive superintendents and assistant superintendents, executive and assistant engineers, superintendents and assistant superintendents of telegraphs, examiners of railway accounts, &c.

Conditions of joining.

In the interests of the British army I consider that no soldier should be allowed to volunteer for or be transferred to the railway service corps until he has completed seven years' service with the colours. Army service is quite short enough as it is. Nor does it seem practicable that soldiers should receive a railway training while still serving with

regiments. No adequate training is possible except by detaching annually a party from each battalion, regiment or battery to the nearest or most convenient railway depôts and workshops, much as parties are now detached for transport training. It will be generally admitted that more than enough men are already detached from British regiments for a variety of purposes. A soldier with capacity, as an artisan, can to some extent find the means in the workshops of his own regiment of acquiring or practising the trade that he knows or desires to know. Furthermore the very *raison d'etre* of the railway service corps requires that every member of it should be a trained soldier, consequently the seven years' previous military training and discipline is, as it were, the essential foundation upon which the other qualifications of the corps will be built up. For training in the duties of railway construction, traffic and administration no short period of absence from military duty will suffice, and the knowledge and experience gained in one course of training must be kept up by successive annual courses. The man's efficiency as a soldier would be undeniably impaired by these renewed terms of absence from his soldierly duties and training, and the now-more-than-ever imperative necessity for the thorough efficiency of the British garrison in India demands that nothing tending to subvert it should be countenanced. We may then look upon any scheme of extra-regimental railway training as not to be recommended, and facilities for intra-regimental railway training there seem at present to be none. Consequently the railway training of the recruit of the North-Western Railway Service Corps should begin at the close of his seven years' service with the colours. He will then probably be from 25 to 27 years of age, an age when a man, whose mind and habits have been disciplined by military service, can very well acquire the duties of a new profession, even if he had no experience of them prior to his enlistment in the army. The education of the orderly room, the offices of the adjutant, paymaster and quarter-master, and the regimental workshops is calculated to qualify a man for railway employ, either as station master, clerk or guard, or as an artisan and mechanic. With a view to ascertaining if a candidate for railway employ is fitted for it by character and attainments, he should be required to pass through a period of probation varying from six months to one year, according to the qualifications required by the branch of the Railway Department in which he seeks employment. This period of probation should be during the eighth year of a soldier's service with the colours in India. To take examples of the different classes of probationers—

A non-commissioned officer in a regiment, a man able to read and write well and a fair accountant, would aspire to employment as clerk, guard, station master, engine-driver, foreman, telegraphist, or some other well-paid and responsible berth, while the private soldier, especially if uneducated, would have to be content with being employed either as an artisan in the railway workshops or in some inferior capacity in which it might be deemed expedient to employ Europeans further than natives. It is obvious that the first-named class of

appointments requires higher attainments than the second, and consequently a longer period of probation, in order that the character and ability of the individual may be thoroughly tested prior to his permanent engagement. A class of men whom it would be desirable to induce to accept railway employ at the close of their military service are the non-commissioned officers of the Royal Engineers serving with the Sappers and Miners or in other capacities in India. It is true that they all or nearly all put in twenty-one years' army service; but at its close they might give, and be glad to give, to the railway service corps from 10 to 15 years' service. Their wide experience of construction of works of every kind, of engineering, telegraphy, and visual signalling, and their long military training would be most valuable. The prospect of good pay and of promotion to the warrant and commissioned grades should suffice to induce at least a portion of them to join it. With the exception of non-commissioned officers and men of the Royal Engineers, whose every-day training specially fits them for railway employ, I consider that no soldier of more than seven years' army service should be allowed to enter the railway service corps.

Conditions of service.

We will now pass to the conditions by which service in the railway corps should be regulated.

Permanency of service.

First and foremost it should be clearly laid down that soldiers (European and native) transferred to the railway service corps are not liable to be called out for any military duty except that connected with their railway duties. It is obvious that the corps cannot possibly be denuded of its members in time of war, the very time when its services are most urgently needed. It should be further laid down that soldiers, either British or native, being transferred from the reserve to the railway service corps, should forfeit, as long as they remain in it, any claim to pension, gratuity or any Government allowance (except perhaps the special monthly allowance of from Rs. 3 to 4 which it is proposed to pay to sepoys of the native army reserve); but in the event of their having to leave the railway corps through no fault of their own, and not attaining railway service pension, they should then receive any pension, gratuity or allowance to which their military service entitled them. With regard to length of service in the corps, that may be regulated by the results of general experience. Europeans who lead a life of exposure and hard physical toil in India can hardly be expected to stand the strain beyond the age of 40 or 45, whereas those whose occupations do not involve such exposure should be able to do good work in India up to the age of from 50 to 55. Thus engine-drivers, stokers, platelayers, all who lead a life of unusual exposure, would not improbably be past their work at 45, while station masters,

Length of service.

guards, clerks, signalmen, artisans and mechanics, &c., would continue to serve till 50 or 55.

Pension.

The question of the period of service qualifying for pension should be regulated by the above considerations. In the British army two years' service in the reserve counts as one year's service towards pension. Such a rule could not be made applicable to the railway service corps, in that each year's

service should count in full towards pension in addition to the seven years' previous army service. Twenty-one years of combined army and railway service should be the minimum period qualifying for pension for the lower grades of the railway service, such as signalmen, artisans, engine-drivers, mates of workmen gangs, &c. For the higher grades, including station masters, clerks, guards, telegraphists, and all whose duties are rather mental than physical, the minimum period qualifying for pension might be fixed at 25 years' combined army and railway service, with increased rates of pension after completing 30 or 35 years of such service. The lower grades, if after 21 years' service they are considered still physically fit, should be allowed to serve on for increased rates of pension after 25 and 30 years' combined army and railway service. Thirty years' service should be the limit for the lower and 35 years for the higher grades. The rate of pension would depend upon the grade or appointment of the individual, provided he had served not less than three years permanently in that grade or appointment.*

If a man breaks down from no fault of his own before having completed the minimum period for pension, he should receive on retirement a gratuity proportionate to his length of service and status in the railway corps. With regard to non-commissioned officers of the Royal Engineers who might enter the railway corps after completing 21 years' army service and so have become entitled to a military pension, they should be allowed to serve four, nine or fourteen years in the railway corps, and then retire on the 25, 30 or 35 years' railway pension of their grade or appointment, at the same time forfeiting their military pension unless that happened to be better than the railway pension to which they might be entitled. If, however, they broke down before completing four years' service in the railway corps, they should retire on their ordinary military pension *plus* a small gratuity proportionate to their status and length of service in the corps. It may be considered unjust that non-commissioned officers of Royal Engineers after being four, nine or fourteen years in the railway corps should obtain the pensions that others earn after 25, 30 or 35 years' service. It should be remembered, however, that the North-Western Railway Service Corps will, if organised, be in Government employ, and if Government thinks fit to allow army service to qualify for railway pensions, there is no injustice in the case at all.

Reverting to the army reserve.

If a soldier should be under the necessity of resigning his situation in the railway corps from no fault of his own, as, for instance, from ill-health resulting from residence in India, he should be allowed, if not physically unfit, to revert to the army reserve at home, or, if physically unfit, he should receive his discharge with gratuity. If removed from the railway corps for misconduct, the nature of the charge made

* For the officers of the corps there must be special pension rules; and as promotion to the grade of officer would be open to the subordinate grades, pension rules providing for this contingency must be framed.

against him should be considered in deciding whether he should be sent back to the army reserve at home or be discharged without gratuity.

Furlough and leave.

The next point to be considered is furlough. During a service ranging over a period of from 14 to 28 years (exclusive of seven years' army service) furlough to Europeans is necessary. The British soldier, who, after seven years' service with the colours and one year's railway probation, is transferred to the railway service corps, should certainly be allowed a year's furlough to Europe after he has completed four years' railway service. Twelve years at a stretch in India is as much as can be reasonably expected of any European. After his first furlough, nine months after each spell of five years' service in India should suffice. Free passage to and fro by troopship or ordinary steamer should be provided by Government both for furlough and sick leave. The above applies to the lower grades. Respecting the higher grades, they should be allowed one year's furlough after five years' service, and a free passage to and fro should be allowed to all drawing less than a certain rate of railway pay.

One month's short leave should be allowed annually to all Europeans serving in the railway corps, provided the exigencies of the service permit it.

It has been suggested that a certain proportion of the Europeans in the corps should be drafted into a sort of reserve (as is the case in the German Railway Corps, service in which is regulated by the same rules as it is in the rest of the German army), and allowed to reside in England, subject to the condition of being obliged to rejoin at once if their services are needed. Such a system, I am convinced, would not answer. The men should be on the spot, ready at a moment's notice when they are needed. The army of a great Continental Power, such as Germany, can be mobilised and concentrated in a fortnight, but from five to six weeks must elapse before men could be summoned from England, even by telegraph, and reach their several posts on the North-Western Frontier of India. When the frontiers of India and Russia march, as they presumably will do in due course of time, the railway service corps must be ready for prompt action.

(3.) Formation of railway corps from native army reserves.

We will now pass on to the native section of the North-Western Railway Service Corps. Just as the European section is recruited from the reserve of the British army so it is proposed to recruit the native section from the reserves of the native army in India. The proposals for the formation of a native army reserve have not yet received the sanction of the Government of India, but they must be accepted, in the form in which they have been put forward by the military authorities, as the only basis we have to go upon in treating of the formation of the native section of the railway service corps. As one of the most essential features of that corps is that it should be composed of good fighting material, trained to the use of arms and disciplined, we may at once dismiss the idea of drafting into it, except

in a few cases, that class of men in the native army from which writers are drawn. In fact we want no *Babus* in it. This being so it may be laid down as a general rule that the natives enrolled in it will not be eligible for employment in the highest grades requiring advanced education. Good practical men of the commissioned and non-commissioned grades we may get, capable of leading and controlling the men under their charge, and good artisans, mechanics and workmen, but not men deeply versed in the three R's. The railway employment for which, it appears to me, the soldiers of the native army reserve should be specially adapted is as railway police and chaukidars (watchmen on the line), and it is difficult to see for what railway duty the ordinary native officer would be fitted except that of inspector and sub-inspector of police. In the military organisation of the railway service corps the native officers would of course rank as subadars or jemadars, and as the inspectors and sub-inspectors of police have not the status and privileges of commissioned officers, it would be well to let them continue to bear the one title of subadar or jemadar both in the execution of their military and police functions. I have seen it proposed that the natives serving in the railway service corps should be entertained under the usual agreements entered into with camp followers. Such proposal I regard as radically subversive of, and derogatory, to the character and object of the corps. It is impossible to look upon a corps, formed from the reserves of the British and native armies, as other than an essentially military body. If these men had remained with the reserves they would be soldiers, and when they are transferred to a corps intended to manage a line of railway in the immediate vicinity of the scene of warlike operations, and also to defend it towards the rear against disaffected and marauding tribes, how can they be regarded as other than soldiers pure and simple? Continental railway corps are part of the regular army of each Power. For purposes of discipline and military instruction, and in time of war, this corps should be under the Commander-in-Chief in India, although in time of peace and for all railway purposes it would obey the orders of the Management of the North-Western Railway. It can be no longer classed as volunteers or militia, but as a regular military corps, and as such should be borne on the strength of the Indian army, especially as in time of war all extra expenditure on its account would be charged to the Military Department. The fighting qualities of the ordinary native railway employé are undeserving of the smallest confidence, and they are consequently unfit for employment on the frontier sections, such as the Bolan and Sind-Pishin Lines, of the North-Western Railway. The proposed formation of native army reserves affords an opportunity of obtaining the very stamp of man that is required for service on those sections. The salient features of the proposals for the formation of this reserve are the following: (1). That there shall be two reserve forces, an active reserve of all arms and a garrison reserve of infantry. (2). That the active reserve be formed of men under twelve years' service who, after not less than five years' service with the colours, may be transferred to the reserve, its numbers being limited to 75 of all ranks for a cavalry regiment, 218 of all ranks

Proposed rules for formation of native army reserve.

for an infantry regiment (in Madras and Bombay infantry regiments the strength of the active reserve is fixed at 160 of all ranks), and 25 per cent on established strength in the corps of Sappers and Miners and in batteries of artillery. (3). That the garrison reserve be formed of infantry soldiers having from 20 to 30 years' service with the colours, or of men of the active reserve of infantry who have completed a total colour and reserve service of not less than 21 years. The garrison reserve is unlimited in number, and is not liable for service beyond the frontier of British India. (4). Men of the reserve become entitled to pension on completing a total colour and reserve service of 25 years. If discharged as unfit before completing 25 years' service, they will be entitled to certain gratuities.

Regulations for transferring soldiers of the native army reserve to the railway service corps.

In framing regulations for the employment of soldiers of the native reserve forces in the North-Western Railway Service Corps, the above rules must be taken as a guide. We see that a man must serve five years with the colours, and assuredly no one desirous of obtaining a well-drilled, trained and disciplined soldier would wish to curtail that period of qualifying colour service. Nor should he have more than twelve years' service (it is obvious that men of the garrison reserve would be quite unfitted for employ in the railway service corps), because when a man gets beyond a certain age he is less able to adapt himself to new duties. The transition from military to police duties is not great; but it is proposed, if feasible, to employ a good many of the natives serving in the railway corps on railway duties that demand both practice and experience.

The native soldiers enrolled in the railway service corps should continue to be borne on the rolls of the native army reserve, but, like soldiers of the British army reserve, they should be engaged for permanent service in that corps. Only if they fail in health, or if they prove themselves unfitted for the railway service, should they be remanded to the active or garrison reserve. In view of the possibility of their being thus remanded the names of all men of the native army reserve drafted to the railway service corps should be borne on the reserve rolls of their respective regiments, but, as it were, on an unattached list—like the British soldier, so the native soldier, who is a candidate for the railway service corps, should be on probation for a period ranging from six to twelve months according to the nature of the duties likely to be allotted to him. For instance native commissioned and non-commissioned officers and educated men of the rank and file who wish to be enrolled as artisans, mechanics, clerks, assistant station masters, telegraphists, inspectors, sub-inspectors and non-commissioned officers of police, or other responsible posts, may remain on probation for one year. For railway police, chaukidars, permanent-way mates and gangmen, pointsmen, &c., six months' probation is sufficient. During this period of probation their conduct and qualifications, both as railway employés and soldiers, will be put to the test. It may be perhaps thought that native soldiers will be unwilling to exchange

Period of probation.

military service for such work as that of permanent-way gangmen, mates of gangs, pointsmen, &c. I think, however, it will be a mere question of pay. At the present moment as much as 8 annas a day (Rs. 15 a month) is being paid to labourers on the Sind-Pishin Line. A sepoy gets Rs. 7 a month *plus* from 1 to 3 rupees good conduct pay, and a trifling allowance for grain compensation If he can exchange this for Rs. 15 or even less a month as a railway labourer, with the certainty of attaining a Government pension later on (I will deal with pensions hereafter), I do not think he will find railway employ distasteful. The labourers now employed on the Sind-Pishin Line have no pension to look forward to. Perhaps the most difficult question is to find suitable employ in the railway corps for native officers. In the rules for the formation of a native army reserve no provision is made for them. They are, however, necessary to the organisation of the railway service corps. At the same time it is neither incumbent nor perhaps advisable to select the native officers of that corps from the native officers of the Indian army. Most of the latter are illiterate, often lacking in energy and too old to adapt themselves to a new profession. Commanding officers would certainly decline to part with comparatively young, active and intelligent native officers, and no others would be of much use. I would, therefore, recommend that native non-commissioned officers of less than twelve years' service, who would be likely to give the corps the benefit of their service for fifteen years or more, should be selected from the native army reserve as probationers for the railway corps, to be promoted to jemadars on satisfactorily completing their year of probation. In the first instance it would probably be necessary to enrol some few native officers of standing and experience as subadars in command of the native sections of the corps, but after that the promotion should go in the ranks of the corps itself by selection. It seems scarcely probable that native officers of long service would, even if fitted for railway employ, find it worth their while to accept it, knowing that a good pension, ensuring them ease and affluence, awaits them within a few years. The present native officers could be only utilised, in addition to his military duties, as an officer of railway police. With the encouragement and extension of education in native regiments we may hope to obtain for the railway service corps native officers, non-commissioned officers and men possessed of other than mere physical and fighting qualities. There are those who imagine that the education of the native soldier would detract from his fighting powers. I rather fancy that the British officer of the present day with his more advanced education (competitive examination, garrison classes and examinations for promotion) considers himself as good a fighting man as his less scientific predecessor. Why then should the fighting classes of India deteriorate by being educated?

Native officers.

It remains to say a few words about the pensions and leave of the native soldiers serving in the railway corps. We have seen that they must enter the native reserve after between five and twelve years' service, or approximately

Pensions and leave.

between the ages of 23 and 32, and I have expressed an opinion that no one over twelve years' service should be eligible for the railway service. Under ordinary circumstances the sepoy becomes entitled to pension, under the new reserve rules, after 25 years' combined colour and reserve service. I think that 20 years' combined regimental and railway service should be the minimum qualifying for pension. At present fifteen years' army service is the minimum qualifying the sepoy for pension ; we may take the medium between that and the 25 years above mentioned. Whether the native soldier of the reserve should or should not draw his reserve pay (from 3 to 4 rupees a month according to rank), in addition to his railway pay, is a question that only Government can decide. I myself should be disposed to say that as his duties are twofold, military and railway, and as he may at any time be remanded, owing to indifferent health or other causes, to the active or garrison reserve, he ought to receive both reserve and railway pay. The latter may be proportionately reduced. In case of a man failing to complete 20 years' combined colour and railway service, and being unfit for either reserve, he should, if discharged for no fault, be given a gratuity proportionate to his grade and length of service. The above rules should hold good for all native ranks. If native soldiers of the railway corps are desirous of extending their service, and are pronounced medically fit, they should be allowed to re-engage and serve for an increased rate of pension on completing 30 years' combined colour and railway service. I consider it beyond my sphere to propose rates of pensions for every grade in the railway service. Leave should be granted to native employés in the railway corps on the terms on which it is now granted to all native soldiers.

Although I have advocated the formation of the railway service corps mainly from the reserves of the British and native army, I by no means desire to exclude all others from the corps. I have already said that the existing 3rd Punjab Volunteer Rifles should be its nucleus, and that young native railway employés of good physique and likely to make good soldiers should be admitted to it. The railway service corps should be employed chiefly on the frontier sections of the North-Western Railway. The completion of the Sind-Pishin Railway (it is said that it will be finished next year) will necessitate a large increase in the North-Western Railway establishment. Of course soldiers from the reserves would require training before they could be sent for duty on the frontier sections. Their place would have to be taken at first by existing railway employés, but as they became efficient they should be sent for duty to the Bolan, Sind-Pishin or other frontier lines.

Strength, discipline, drill, arms, dress and equipment of corps.

Having treated of the method of recruiting the corps, I will now pass on to consider its approximate strength, its discipline, drill, dress, equipment, arms and other material points. I do not propose to deal with the question of pay and pension, excepting the few suggestions I have already made, as those are subjects the details of which only the Railway and Military Accounts Departments can decide. The question of pay is treated of in detail in Appendix 2 of the Report of the Railway Service Corps Committee assembled in 1878.

Strength.

In order to estimate the number of men requisite for the working and defence of the frontier sections of the North-Western Railway, I have selected as a unit the establishment required for working 100 miles of single line. We will suppose that this section of 100 miles is worked in two subdivisions of 50 miles each, that there is a terminal station at each end, and an engine-changing station in the middle* ; also that, these being the three principal stations on that section, the greater portion of the Engineering, Traffic and Locomotive Departments is concentrated at those three stations, and the Manager and Staff are located at one of the terminal stations. I find that there is considerable divergence of opinion as to the strength of establishment required to work 100 miles of single line. I conclude that this divergence is due to the fact that some estimates are framed for working the line under ordinary circumstances and others for working it under heavy pressure, as in time of war. It will be best to endeavour to adopt a medium estimate. It is generally admitted that motives of economy have led to the too general employment of natives on Indian railways to the exclusion of Europeans. It has been pointed out by Lord Sandhurst, General Chapman, and others, that the more extensive employment of Europeans on Indian railways tends to promote the security of British rule in India. We may further add that it is conducive to the protection of the Indian Empire from external invasion, especially on the frontier railways. I have already pointed out that we cannot expect to find among the men of the native army reserve, from whose ranks I propose in part to recruit the railway service corps, men of advanced education. The Babu is obviously out of place where fighting qualities are requisite. For all posts, therefore, that require such education and military training combined we must look to Europeans and Eurasians. Many of the latter are already employed on the North-Western Railway and enrolled in its volunteer corps. In future in using the word European I wish to be understood to include under that term both Europeans and Eurasians.

Organisation in three battalions of four companies each.

The frontier lines of railway with which we are now more particularly concerned are the Sind-Pishin Line from Sibi to Shebo, and the Bolan Line from Rindli to Quetta. Anyhow they may be selected *exempli gratiâ*. The aggregate length of these lines may be roughly estimated at 300 miles or, in other words, three units, each of 100 miles of single line. Consequently the railway service corps for the working of this 300 miles of line might be organised as a regiment of three battalions, one battalion for each unit. The re-organisation of the native army in regiments of three battalions each has more than once been proposed. The battalions of the German railway corps are in time of war broken up into (as translated in English) Construction, Management and Working Companies. I have before remarked that the conditions affecting a railway service corps in India, at present at least, differ somewhat from those affecting a Continental

* The average distance between engine stations is stated by another authority to be 100 miles, but on ghât lines the distances are no doubt less. For instance, on the Bolan Line there must be engine stations at each extremity of the steep gradient from Dozan to Darwaza, as well as at the terminal stations.

railway corps. In fact in the former the special duties of a Construction Company are of less immediate importance than those of the Management and Working Companies. The establishment of an Indian railway is divided into three chief departments, the Engineering or Maintenance, the Locomotive and the Traffic, to which we must add the General Department (in which I include the Accounts and Store Branches and the Railway Police) and the Telegraph Branch. I therefore suggest that each of the three battalions be subdivided into four companies to be known as—

No. 1. Direction and Telegraph Company.
„ 2. Engineering or Maintenance Company.
„ 3. Locomotive Company.
„ 4. Traffic Company.

It is not intended or necessary that these companies should be by any means of equal strength.* Their strength must be regulated by

* Appendix Q of the Railway Service Corps Committee Report of 1878 estimates the strength of all grades of the several departments for 100 miles of line as under :—

Engineering Department	382
Locomotive „	320
Traffic „ including signallers	180
General Department and Medical Staff	113
Total ...	995

Menials and inferior servants are deducted from the above estimate.

For purposes of comparison I quote here the war strengths of the three classes of railway service companies in the German army—

	Construction or Artificer.	Management or Traffic.	Workmen.
Captain	1	1	...
1st Lieutenant ...	2	1	1
2nd Lieutenants ...	6	4	1
Assistant Surgeon ...	1	...	...
Paymaster ...	1	...	...
Sergeant-Majors ...	2	2	3
Sergeants ...	6	12	3
Non-Commissioned Officers	17	27	9
Lance-Corporals and Privates	175	159	186
Train Soldiers ...	11	6	2
Hospital Assistants ...	1	...	...
	223	212	205

It will be noticed that the proportion of the officers and non-commissioned officers to the privates, especially in the Construction and Management Companies, is very large. This is due doubtless to the fact that the nature of the duties of those companies creates a large number of responsible posts which can only be filled by officers and non-commissioned officers. A German Railway Management (Traffic) Company is considered to be sufficient to manage from 45 to 60 kilometres (28 to 37 miles) of line. The officers of an artificer company are told off for duties as follows : 1 Captain as Chief Engineer, 2 First and 4 Second Lieutenants as Line Engineers, 1 Second Lieutenant as Mechanical Engineer and 1 Second Lieutenant as Telegraph Engineer. The duties of a Traffic Company are thus allotted : The Captain and 1st Lieutenant are respectively superintendent and assistant superintendent, and the 4 Second Lieutenants are station masters. Of the 40 non-commissioned officers

that of the departments they represent and by the demands that may be made on them in time of war. In this latter case, *i.e.*, in the event of war, the two companies that may be called upon to furnish contingents for service with the army front line will be Nos. 1 and 2. Later on, when the line is partially or wholly completed, Nos. 3 and 4 will have to furnish contingents for working it. It may be necessary to construct rapid extensions of railway and telegraph, and such work will of course fall on the telegraph section of No. 1 Company and on the Engineering or Maintenance Company. Of each of these companies (Nos. 1 and 2) we shall have in all on the Bolan and Sind-Pishin Lines three, and in time of war a Railway and Telegraph Construction Company for service with the front line should be formed of contingents from each of them. This company should be looked upon as a *corps d'élite*, and receive extra rates of pay.

Railway and Telegraph Construction Company.

Having these facts in view, it stands to reason that the strength of Nos. 1 and 2 Companies should be sufficient to be able to spare these contingents and yet efficiently work the railway and telegraph sections under their charge. This must be borne in mind in framing an estimate of their required strength. It should further be borne in mind that for purposes of drill and musketry instruction certain portions of the corps must be successively struck off all railway duty. The establishment must therefore be able to dispense temporarily with the services of the portion struck off for drill and musketry, and yet work the line efficiently. It may perhaps be argued that the subdivision of the battalion into the four companies above named is not a suitable one because the component parts of each company will be scattered far and wide over the hundred-mile section to which they belong. But I maintain that this is not of the slightest consequence. The military training for all companies will be the same, being nothing more than the ordinary training of an infantry

Military training.

(excluding 1 Sergeant-Major) 1 is Traffic Manager, 4 are assistant station masters, 12 engine-drivers, 7 guards, 7 baggage guards, 3 line inspectors and 6 telegraph clerks. Of the 20 lance-corporals, 3 are guards, 1 foreman of telegraphs, 2 foremen of platelayers, 12 firemen, and 2 in charge of stationary engines. Of the 139 privates, 4 are shunters, 18 pointsmen, 14 platelayers, 7 engine-fitters, 4 greasers, 2 engine-cleaners, 55 porters, &c., and 35 brakesmen.

The Workmen Companies are employed as porters and labourers in loading and unloading trains with warlike and other stores, and as store-keepers and storemen at stations, &c.

The above details are obtained from articles by Major Rothwell and Captain Hare in Nos. CXXXII and CXXXIII of the Journal of the Royal United Service Institution.

It will be observed that the composition and duties of the Direction, Locomotive, Engineering and Traffic Departments of Indian railways by no means correspond with those of the Management (Traffic), Artificers and Workmen Companies of the German army, and that consequently no exact comparison can be instituted between the two, nor can the organisation of our Indian railway service corps be conveniently assimilated in points of detail to that of the German.

corps.* It is plain that the railway establishment at each station, whether the individual belongs to Company No. 1, 2, 3 or 4, must be drilled and trained together, so that they may learn to act in unison as one body, and that every officer, non-commissioned officer and man may know his place and duty. Thus, while every member of the corps is on a distinct footing as a railway official, the military duties and training of one and all are the same.

Promotion.

One of the most difficult points to arrange satisfactorily is the carrying out of the railway and regimental promotions on a compatible system. There are obvious objections to placing a railway superior under the orders of his railway inferior regimentally, and yet on the other hand the efficiency of the corps demands selection. After all the difficulties in a railway service corps on this score will not be greater than similar ones in the army in general. The principle should, from the first, be laid down that railway and regimental promotion are independent the one of the other. At the same time the union of the two will tend to smooth the working of the corps.

However, in regulating regimental promotion in the railway service corps, we should recollect that a thorough knowledge of railway duties is the first essential, and that military capacity and soldierly qualities, although very important and, as before stated, indispensable, should be allowed to carry somewhat less weight, because, under ordinary circumstances, these qualities would be but rarely put to the test. After all the railway corps is intended to fight only in cases of exceptional emergency. In cases where it is deemed unadvisable to give a railway official regimental promotion, warrant or honorary rank not carrying with it any substantive regimental appointment might be accorded instead.

Mounted Section or Company.

There is one other point to be considered, and that is the organisation† of a body of mounted railway engineers from the ranks of the railway service corps. This company should, as I think, be composed of men drawn from the Railway and Telegraph Construction Company, which I suggested above should be formed of contingents from Nos. 1 and 2 Companies of each battalion of the railway service corps. In fact it should be a section of the Construction Company, working in ordinary times like every other portion or unit of that company, but ready to move at the shortest notice rapidly to any point where its

* Their railway duties they will learn by daily practice. At the same time I would recommend that the Railway and Telegraph Construction Company should be exercised in the work of rapidly constructing, repairing and demolishing lines of railway and telegraph. For this purpose a section of it should be annually struck off all duty, as for military instruction.

† I have already drawn attention to the fact that the German cavalry are specially trained to railway-demolition. I am not aware that our Indian cavalry are so trained. Therefore I recommend that the railway service corps furnish its own mounted branch for this purpose, whether for the rapid demolition or repair of its own or an alien line, railway or telegraph.

labour would either facilitate the movements and action of its own army or retard those of the enemy. In the event of sudden attack it could easily effect a safe retreat from any other arm than cavalry or mounted infantry, and even in the face of the latter it should, unless greatly outnumbered, be able to effect a masterly retreat. Only the neglect to post vedettes properly would give the enemy an opportunity of surprising and capturing them while at work. Besides, a body of cavalry would, no doubt, if possible, be sent out to cover it from attack while working. I believe that supported by cavalry it might raid with effect on the railway communications of a hostile army with its base. Some remarks on its dress, arms and equipment will be given hereafter.

Defence of stations and line.

As the formation of a railway service corps has for one of its main objects the protection of the station and line from the effects of any internal disturbance, *i.e.*, the rebellious or marauding propensities of our own Indian subjects, we are naturally led to consider whether or not the stations and most assailable points on the line (such as bridges, tunnels, cuttings, etc.) should be fortified. The elaboration of any such system of defence I look upon as the duty of the Royal Engineers, and I consider it beyond my sphere and the sphere of this essay to do more than allude to it. An elaborated scheme for "The defence of Railways in India" will be found in Vol. II, No. 7, of the Journal of the United Service Institution of India, pages 55—64. The one point in the scheme therein contained which now concerns us is the fact that the writer considers the railway volunteers as the only source of defence to the Indian railway, and calculates that a military force, 3,240 strong, would be required, in addition to the volunteers, to defend the East Indian Railway alone. He roughly estimates that three men per mile are requisite for the defence of any line of railway. Now the aggregate strength of the permanent-way gangs on any line of railway in India is on an average three men per mile. Consequently, if the calculations of the writer above quoted are correct or approximately so, the railway service corps composed entirely of trained soldiers, European and native, would amply suffice for the defence of the line against any ordinary internal disturbance. A competent authority on railway administration roughly estimates at the present time the railway establishment for working 100 miles of single line at 533 of all grades, and the Railway Service Corps Committee of 1878 puts the figure at (including the medical staff but exclusive of menials) 995.* The first estimate gives an average of $5\frac{1}{3}$ men per mile, and the second of nearly 10. Other estimates for high pressure work are, I understand, even higher. In the estimate I have appended to this essay I have endeavoured to strike a medium, always allowing for the demands of the Railway and Telegraph Construction Company and the mounted

* In a lapse of eight years the working of a line may have been simplified.

engineers in time of war and the detachments struck off duty for military instruction in time of peace.

Discipline.

I have already stated my opinion that the corps should be placed on the footing of a regiment of the regular army because it is proposed to form it mainly from men who have served in the army, because it is impossible to regard it as a volunteer or militia corps, the enrolment of natives of India in volunteer corps not being permitted, and, finally, because the four greatest Continental military powers have set us the example of raising railway service corps as an essential component of their regular army. Being regulars the corps must be under the orders of the Commander-in-Chief in India in all matters of training and discipline in time of peace, and absolutely in time of war, and all ranks of it must be subject to military law like any other corps of the regular army. The Europeans would be under the Army Discipline Act, and the natives under the Indian Articles of War. The officers of the corps would sit on courts-martial like other officers of the regular forces. The commanding officer of each battalion should be empowered to hold a summary court-martial on any native in his battalion. It may be reasonably hoped that the European and native soldiers of the reserve drafted into this corps, being men who have served a number of years with the colours and left their regiments with good characters from their commanding officers, and who have furthermore passed creditably through a period of probation extending from six months to one year, will but rarely commit offences against military discipline. Should any man, however, prove inamenable to discipline, and so be continuously taken away from his railway duties to undergo confinement or other punishment, it is recommended that he should, without hesitation, be remanded to the reserve to which he belongs, provided he is not guilty of any very serious offence.

Drill.

Under the system proposed of forming the railway corps of reserve men most of its members should enter it as thoroughly trained soldiers. Drill with them means not the tedious course of a recruit, but the practice which the drilled soldier requires to maintain his efficiency. The drill of the battalion will of course be carried out under the orders of the commanding officer and the direct supervision of the company officers and non-commissioned officers, the adjutant and the drill instructors. The latter will each have a company located on a particular section of the line and should, under the orders of the adjutant and company officers, continually travel up and down it for the purpose of superintending the exercise of the detachments at each station in musketry, parade and field exercises, and inspecting their arms, accoutrement, equipment, &c. At all stations, large and small, parades for drill and musketry instruction should be taken at such times and as often as the commanding officer may order by the senior officer or non-commissioned officer present.

It will probably be sufficient to strike off each man for one month in the year for drill* and musketry instruction. With regard to the Railway and Telegraph Construction Company, and its mounted section, they would have to go through additional courses of instruction in the duties of the branches to which they belong, *i.e.*, in construction, repair and demolition of railway lines, and in manœuvring as mounted infantry both for purposes of offence and defence. As the mounted section must necessarily move completely equipped with the tools and material requisite for the work that may be allotted to them, they should in particular be exercised in the rapid packing and unpacking of those tools and material. What these should be will be stated under the heading of equipment. As the Construction Company has more arduous drills, and is composed presumably of picked men, and in time of war may have to undertake enterprises of considerable danger, they should in peace time receive a higher rate of pay than the men of the other companies. No increase of pay would be necessary in time of war, except of course the allowance of batta, if it be granted to the other troops. The men of the mounted section should receive horse allowance.

Arms, dress and equipment.

The German railway regiment and the Austrian railway and telegraph regiment are, in point of arms, dress and equipment, closely allied to the Pioneer regiments. The North-Western Railway Service Corps would require no other arms than the rifle in use with infantry (soon to be the Martini-Enfield) and the sword-bayonet. The mounted engineers should have carbines. On service our Indian infantry carry 70 rounds; but 40 rounds per man should be sufficient for the soldier of the railway corps, except in special cases. The non-commissioned officers and men of the Austrian corps carry only 20 and 30 rounds respectively. For ordinary every-day uniform, whether for European or native, nothing can be better than a khaki blouse with pockets, loose, easy pegtops and canvas gaiters *minus* pipeclay. The European will wear the helmet and the native the puggaree (khaki) with some suitable badge. Clothing must of course be regulated by climate, and as the mountainous district lying between the Pishin and the plain of Upper Sind, varying in elevation from

* The period for this month's training must depend on the locality. It must obviously be between 1st November and 1st March or 1st April for the detachments on the lower part of the line, while those at the higher elevations should be exercised between 1st March and 1st November. As rifle ranges cannot be constructed at more than a few stations, which would naturally be the largest ones, *i.e.*, regimental or battalion head-quarters, it would be best to assemble the detachments at out-stations at the head-quarters' stations of the battalions for their month's training. For musketry practice they could be railed up from time to time, a special day being allotted to each detachment.

a few hundred to 6,000 or 7,000 feet above the sea level, has been selected as the locale of the railway service corps, very great variations of climate and temperature must be provided for. The heat of Sibi and Rindli is, if not absolutely unequalled, at least not exceeded by that of any part of the globe, and the great cold of Darwaza, Quetta, Kach and other elevated spots in winter is well known. Even in the midst of the hot season the sudden change from the heat of Bibinani and Mach to the chilliness of the night at Darwaza is found to be decidedly trying and often productive of fever. This being so, care should be taken that the hot and cold weather clothing of the corps should be suited to the needs of the climate. White clothing in the hot weather will of course be permitted to the Europeans. At such places as Darwaza and Kach warm clothing should always be worn between sunset and sunrise.

On the shoulder cord the letter R might be worn just as the Transport, Medical and Commissariat Departments wear respectively T, M and C. While on probation men should continue to wear the uniform of the corps in which they had previously served, if they possess such uniform. As yet no definite decision seems to have been arrived at on the subject of the best type of boot for the native soldier. As far as my own experience goes, native soldiers will march very well in an English ammunition boot, which, if of good quality, has the advantage of outlasting several pairs of Indian-made boots and shoes. In some regiments the preference is given to the English boot even by native officers and soldiers themselves. On the other hand the natural *chaussure* of the native is the country-made shoe, and it is not surprising that he should prefer that to which he is accustomed. Such a shoe however cannot be worn with a gaiter, and affords no protection to the foot and ankle against thorns, speargrass, &c. In a corps composed of Europeans and natives, both with a view to general utility and uniformity, the English ankle boot should be adopted.

In a book entitled "From Sidanto to Sarbruck" published in 1870 by an officer of the R. A. we read (p. 159):—

"The boots worn on the march (by the Prussian cavalry) are either the Napoleon boot, evidently a favourite and most serviceable article, or the ordinary Wellington, slit up the back seam, and made to fasten by leather loops and buttons. Thus converted, it can be taken off and put on again with the greatest ease (the trousers, made narrow at the bottom, being tucked neatly inside the boot), no matter how thoroughly soaked with rain. * * * * * This ingenious device appears well worthy of imitation, more especially as it is equally applicable to infantry, some of whom we saw on the march thus shod." Such a boot, dispensing with the use of the gaiter, might with advantage be tried in India. It seems at any rate just the boot for mounted infantry and the proposed mounted section of the Construction Company, in which what is practical should alone be aimed at.

The equipment of a railway service corps is a question that cannot be dealt with in detail here. I will content myself with referring to the Equipment Tables of the Public Works Department and the Equipment Tables of the Royal Engineers and Sappers and Miners in India. In these elaborate lists of engineering and telegraph equipment and the standard method of loading them on mules will be found. The equipment of the Continental railway corps is much the same as that of Pioneer regiments, and I therefore conclude that the equipment of a Construction Company of an Indian railway corps will not be unlike that of a native Pioneer corps. The following Table gives the "list of stores forming the equipment of a Pioneer regiment to be taken on service, specifying each mule load" :—

No. of mules.	Crowbars.	Jumpers.	Axes, pick.	Mamooties.	Handles, spare.	Spoons, miners'.	Hammers, sledge.	Wedges, miners'.	Axes, felling 4½lbs.	Powder barrels of 100lbs.	Fuze, barrels.	Tool chests.	REMARKS.
1	6	...	...	...	...	4	...	...	...	...	...	...	
2	6	...	...	...	...	4	...	...	...	...	...	...	
3	6	...	...	...	...	4	...	...	...	...	...	...	
4	6	...	...	...	...	4	...	...	...	...	...	...	
5	6	...	...	...	...	4	...	...	...	...	...	...	
6	..	8	...	...	...	4	...	...	...	...	...	...	
7	4	2	...	...	10	4	...	...	...	...	...	..	
8	6	...	...	...	10	...	...	...	...	...	...	...	
9	...	8	...	...	10	...	...	...	...	...	...	...	
10	...	10	...	...	...	...	...	..	...	...	...	...	
11	...	4	20	...	...	..	...	...	...	...	...	...	
12	...	4	10	5	...	...	...	...	...	...	...	...	
13	...	4	10	5	...	...	...	...	...	...	...	...	
14	...	...	30	5	...	...	...	...	...	...	...	...	
15	...	...	30	5	...	...	..	...	...	...	...	...	
16	...	...	..	20	40	...	...	...	...	...	...	...	
17	...	...	...	...	30	...	10	...	...	...	...	...	
18	...	...	...	...	90	...	...	...	...	...	...	...	
19	...	...	...	...	50	8	...	...	10	...	...	...	
20	...	...	...	...	...	...	...	...	...	2	...	..	
21	...	...	...	...	...	...	...	...	..	2	...	...	
22	...	...	...	...	...	...	...	...	...	...	2	...	
23	...	...	...	20	20	4	...	8	...	...	...	...	
24	...	...	...	...	...	...	...	...	...	...	...	2	Containing carpenter's tools, assorted.
25	...	...	...	...	...	...	...	...	...	...	...	2	Containing blacksmith's tools, assorted.
Total	40	40	100	60	260	40	10	8	10	4	2	4	

In the German army every Pioneer company has the following portable tool equipment :—

German Pioneer equipment.

Carried by the men in leather cases : 88 large shovels, 44 picks, 45 axes and 17 hatchets. Carried in the company tool wagon : 60 large shovels, 30 picks, 20 axes, 12 saws, 6 crowbars, &c.

For service in Afghanistan the equipment of a Construction Company should be specially devised for loading on pack transport (mules or ponies), although where the roads are sufficiently good cart carriage may be utilised. Wherever rails are laid equipment trains would, of course, take the place of both pack and draught transport.

The Telegraph Construction Section.

The telegraph section of the Construction Company, while in no way differing from the rest of the corps as far as military training, arms and dress (for R. on the shoulder cord R. T. or TEL. might be substituted) are concerned, must necessarily have a special organisation, telegraph-construction-training and equipment. As some guide to a calculation of the required strength and composition of the section, I will quote the following figures which have been kindly furnished me by the Director-General of Telegraphs in India :—

I. Telegraph officials of all grades employed from Rindli (*viâ* Bolan) to Quetta and from Sibi (*viâ* Harnai) to Quetta.

* 1 Assistant Superintendent.
1 Inspecting Telegraph Master.
1 Inspecting Signaller.
1 Clerk, Superintendent's Office.
1 ,, Quetta Subdivision.
8 Telegraph Masters.
†29 Signallers (of whom 12 are military).
2 Battery men.
2 Sub-Inspectors.
11 Line riders.
2 Line men.
‡3 Peons.

II. Strength and composition of telegraph party for constructing and working a temporary line 100 miles long in Afghanistan, with offices 10 miles apart.

1 Superintendent.
1 Assistant Superintendent.
1 Sub-Assistant Superintendent.
§ 20 Military Signallers (*i.e.*, 2 men per office for 10 offices).
4 Sub-Inspectors } for construction and maintenance.
12 Line men }

* Till recently a superintendent was also employed.

† On 300 miles of railway about 70 signallers would be required, stations being 10 miles apart, and allowing for extra hands at large stations.—*Author.*

‡ Also 20 menials.

§ These should be 22, there being 11 offices including terminal offices.—*Author.*

10 Line men for interruption duty, *i.e.*, 1 at each office.
30 Labourers (local labour should be procurable).

Taking these figures as a guide, a Telegraph Construction section should consist of—

2 Officers (Superintendent and Assistant Superintendent).
5 European non-commissioned officers (Sub-Assistant Superintendent and 4 Sub-Inspectors).
22 European or native soldiers * (signallers).
22 Native soldiers (line men).

If deemed advisable the 30 labourers might also be native soldiers. Their duties would be such as Pioneers and Sappers have to perform. The strength of an Austrian field telegraph detachment is 1 officer and from 64 to 67 non-commissioned officers and men.

If we add Lists Nos. I and II together *plus* 41 extra signallers and 2 peons we shall have approximately the establishment requisite for working the railway telegraph and for providing in time of war a detachment for field telegraph construction.

Officers.

† 1 Superintendent of Telegraphs.
2 Assistant Superintendents.

European Warrant and Non-Commissioned Officers.

1 Sub-Assistant Superintendent.
† 1 Inspecting Telegraph Master.
† 1 Inspecting Signaller.
† 1 Clerk, Superintendent's Office.
1 Clerk, Branch Office.
8 Telegraph Masters.
6 Sub-Inspectors.

European and Native Soldiers.

90 Signallers (45 European and 45 native soldiers).
2 Battery men (European).
40 Line men and line riders and peons (native).

To the above list should, I think, be added 1 assistant and 2 sub-assistant superintendents and 2 branch clerks (so as to give one of each to each battalion of the railway corps), 2 telegraph masters and 2 sub-inspectors.

It may be found advisable to enrol to a limited extent in the telegraph section of the railway corps telegraph employés on all parts of the North-Western Railway. In the event of the Telegraph Construction section being detached for field service, the employés so enrolled can be sent to do duty on the frontier sections of the railway.

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* One European and one native at each office.
† Those marked thus will be at the corps head-quarters.

Special allowances.

Under the present system, when a telegraph detachment drawn from the staff under the orders of the Director-General of Telegraphs in India is sent with an army in the field, the members of it receive extra rates of pay, ranging from 17½ to 50 per cent., on the ordinary pay of their appointment.* Soldier signallers draw rations or Rs. 2 a day in lieu of rations and 12 annas a day telegraph pay, *plus* 8 annas a day extra, if in charge of an office. Warm clothing is also supplied. Similar special allowances should be made to the telegraph sections of the railway service corps. The corps consisting of three battalions, there would be three such sections, *viz.*, one in No. 1 Company of each battalion. The telegraph section of the Railway and Telegraph Construction Company for field service would be formed of officers, non-commissioned officers and men selected from those three sections.

Telegraph material and equipments.

The material for the construction of the telegraph line and the equipments of the offices will be conveyed on pack or draught transport as may be most convenient and suited to the nature of the roads and country. As a telegraph line is constructed in as straight a line as possible, more or less, irrespective of roads, pack transport is the best. Of what the material and equipment consists, and how it should be packed and loaded, full information can be obtained from the Equipment Tables of the Telegraph Department and Sappers and Miners.

Mounted section of railway corps.

The work for which the mounted section of the Construction Company is best fitted is demolition both of railway and telegraph lines, whether those of the enemy or its own army. 100 of all ranks is a sufficient strength, of which half should be Europeans and half natives. They should be picked men of strong physique, good riders, and accustomed to tend horses. Men who had served in British or native cavalry regiments would be the best adapted for the work. The weakest point of mounted infantry is the riding and management of the animals on which they are mounted. What does an ordinary infantry soldier know, as a rule, of a horse? The result for the animal is sore back and bad condition. This therefore must, if possible, be obviated; and for that reason I suggest that only men who have either served in the cavalry or are quite at home with a horse and on a horse should be enrolled in the proposed mounted section. They may at times, as for instance in making a raid on the enemy's railway communications, have to ride very long distances, and they must therefore understand how to husband the strength of their steeds.(*a*) Men who cannot ride necessarily cause their horses extra fatigue, and moreover themselves become so sore and stiff after a long journey as to be unfit for any hard work. Of the 100 men 88 should be of the Railway and 12 of the Telegraph Construction Branch. They should be mounted on strong ponies from

(*a*) See G. O. C. C. dated 2nd June, 1886, pages 238—241.

* These rates of extra pay are also allowed to all telegraph officials now serving beyond Sibi.

13-2 to 14 hands high, and armed with Martini-Henry Carbines. The best method of carrying the carbine for mounted troops is a subject of much difference of opinion. If slung on the back it very soon wears a hole in the man's uniform, and if carried in a bucket attached to the saddle any accident separating the rider from his horse robs the former of his only weapon. Captain H. S. Massey, of the 19th Bengal Lancers, has invented a new carbine sling, which seems likely to prove a success. It is about to be tried in the 19th Bengal Lancers. It appears well-suited for use in the mounted branch of the railway corps. The dress, accoutrements, &c., very recently recommended for the mounted infantry in Upper Burma by Major General White, V.C., C.B., are as under :—

1 Pair Cord Pantaloons.
1 Drab Serge Coat.
1 Great Coat.
1 Pouch for 20 rounds ammunition.
1 Bandolier for 50 „ „
1 Knife and Lanyard.
1 Light Hunting Saddle with wallets and baggage straps, bridle, headropes, &c , complete.

In cold weather each man must carry on his own pony two blankets for himself and a jhool or blanket for the horse. He should carry a sword-bayonet both for purposes of offence or defence and for use in camp, as for cutting wood, &c., &c. Each man must carry the tool or tools requisite for his railway or telegraph work (see list above of Pioneer equipment) affixed to some part of the saddle, and some men must carry powder and fuses properly packed. The saddles, which could be turned out at the Cawnpore Factory, should have special arrangements for adjusting each kind of tool and for the powder and fuses. It is obviously out of the question for a mounted body that must move rapidly to be hampered with baggage animals laden with tools and explosive charges. Dynamite or gun cotton might also be carried for destroying rails, &c. The proposed composition of the mounted section will be found in the Appendix.

Proportion of Europeans to natives in corps.

I do not consider that any hard-and-fast rule can be laid down as to the proportion of Europeans to natives that should be adhered to in the organisation of the corps. Europeans and natives must be employed in those posts for which they appear individually best fitted. At the same time I would recommend that, as far as financial considerations will admit, Europeans should be employed in the corps in every possible post. I further think it would be desirable to allow all employés (Europeans and efficient volunteers at least) on any State Railway in India to volunteer for service in the North-Western railway service corps, and in the event of a serious war breaking out he should be at once transferred to the North-Western Railway for duty. There seems some doubt about employing soldiers of the native

reserve as porters and labourers on the railway. The question of course is whether or not native soldiers would accept such employ.

In the Continental railway corps the porters and labourers are all necessarily Europeans.

Military staff.

If the railway corps consists of 3 battalions of 4 companies each, including the Railway and Telegraph Construction Company with its mounted section, I would suggest that the following military staff should be attached to it :—

1 Colonel of Royal Engineers as commandant, having concern only with the military training of the corps and railway and telegraph construction and complete control over it at time of and for the purposes of war..

1 Captain of Royal Engineers, as staff officer, to remain at the head-quarters of the corps and to assist the commandant in supervising its railway instruction, specially that of the Railway and Telegraph Construction Company.

3 Sergeants of Royal Engineers attached to each battalion for a similar purpose.

1 Infantry Captain as staff officer at the head-quarters of the corps to assist the Commandant in its drill and musketry training.

3 Infantry Lieutenants, as Adjutants of battalions, for do.

4 Drill Instructors and Staff Sergeants per battalion for do.

1 Surgeon-Major at corps head-quarters.

3 Surgeons in charge of the three battalions.

2 Sergeants, Staff Clerks, at head-quarters.

3 Sergeants, Battalion Clerks.

The other officers of the corps would be taken from the railway service. The existing staff of the North-Western Railway numbers two, if not more, officers of the Royal Engineers, and the officers of the 3rd P. V. R. C. know something of military duties.

Head-quarters of the corps.

As far as can be seen at present, the best site for the head-quarters of the railway service corps will be either at Quetta or at some central point in the Pishin.

The point of junction of the Bolan and Sind-Pishin Lines, when they are joined, would be the best place for the head-quarters, firstly, as being central, and, secondly, because so important a point must necessarily be strongly garrisoned, and the constant association of the corps with other regular troops would tend to increase and maintain its military spirit and efficiency. The corps should be annually inspected by the General Officer Commanding the district.

Guards.

A regular corps, organised as I propose the railway service corps should be, must necessarily have barracks, and store-rooms for arms, ammunition, accoutrements, clothing, and railway and telegraph equipment. The chief store-rooms would of course be at the head-quarters of

the corps and the battalions; but at each station, large or small, there must be some place, unless every man kept his own, where the arms, accoutrements and ammunition of the employés at that station could be kept. It is scarcely practicable that the men could be spared from their railway duties to go on guard. At large stations the requisite guards could be furnished by a native infantry regiment, while for the security of the barracks a system of line watches, such as now prevails in native corps, might be instituted. At the smaller stations near which there are no troops the store-room must be safeguarded by the railway employés themselves.

In conclusion I append—

Formation and establishment of the four companies of each battalion, and of the Construction Company and its Telegraph and Mounted Sections.

(I.) An estimate of the approximate strength of each of the four proposed companies of a battalion of the railway service corps, showing the several grades and classes of the railway employés of each department (corresponding to the company), divided under the headings of European officers, warrant and non-commissioned officers and privates, and native officers, non-commissioned officers and privates. It is thought that the strength here given will allow of $\frac{1}{12}$ of the whole being struck off duty at a time for a month's military training, and of detachments from Nos. 1 and 2 Companies being in addition withdrawn from time to time for practice in the construction, repair and demolition of railway and telegraph lines, under conditions resembling those of actual warfare. I premise, however, that the arbitrary allotment of military rank and functions can scarcely be carried into actual practice. Only personal experience of individuals can afford data for the selection of the railway official best qualified to perform the duties of any particular military grade and appointment.

I have before remarked that in the German railway service the number of officers and non-commissioned officers is abnormally large in proportion to the number of men. This too will be found to be, unavoidably I think, the case in the North-Western Railway Service Corps.*

(II.) The constitution of the Railway and Telegraph Construction Company to be formed in time of war from Nos. 1 and 2 companies of each battalion for service with the front line of the army, with its telegraph and mounted sections.

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* The only authorities that I have been able to consult as a guide in making this estimate differ very widely. "Where doctors differ, 'tis folly to be wise." The strength of an Austrian railway company to work from 28 to 37 miles of line is 7 officers, 59 non-commissioned officers and 147 men, or for 100 miles 3 companies aggregating with the Inspection Establishment about 29 officers, 189 non-commissioned officers and 461 men.

I.

A.—No. 1 Company, Department of Direction, inlcuding Telegraph and Medical Establishment.

European Officers.

1 Manager.
1 Assistant Manager.
1 Examiner of Accounts.
1 Assistant Superintendent of Telegraphs.
1 Surgeon.

Total ... 5

Native Officers.

1 Inspector of Police (*Subadar*).
1 Sub-Inspector of Police (*Jemadar*).

Total ... 2

European Warrant and Non-Commissioned Officers (Sergeants and Corporals and Lance ditto).

1 Head Clerk.
1 Head Accountant.
1 Travelling Inspector of Accounts.
1 Head Storekeeper.
1 Paymaster Clerk.
2 Assistant Clerks.
2 Assistant Accountants.
2 Sub-Storekeepers.
1 Assistant Paymaster Clerk.
1 Cashier.
1 Sub-Assistant Superintendent of Telegraphs.
1 Clerk to Assistant ditto.
4 Telegraph Masters.
2 Telegraph Sub-Inspectors.

Total ... 21

European Privates.

12 Clerks (all branches).
15 Telegraph Signallers.
1 Battery man.

Total ... 28

Native Non-Commissioned Officers.

6 Clerks (all branches).
5 Head Constables.
1 Head Daftari.

Total ... 12

Native Soldiers.

6 Clerks (all branches).
25 Line watchmen.
50 Constables.
5 Daftaris.
15 Telegraph Signallers.
8 Peons (all branches).
12 Line men (Telegraph).
10 Workmen (Telegraph).

Total ... 131

Medical Establishment.

1 Apothecary (European).
1 Hospital Assistant (Native).
2 Dressers (1 European, 1 Native).
2 Compounders (1 European, 1 Native).

Total ... 6

Grand Total...205

B.—No. 2 Company, Engineering Department.

Officers.

1 Executive Engineer.
2 Assistant Engineers.

Total ... 3

Native Officers.

1 Subadar.
2 Jemadars.

Total ... 3

European Warrant or Non-Commissioned Officers.

1 Superintendent of Maintenance.
1 Assistant ditto.
1 Head Clerk.
1 Assistant Clerk.
1 Head Draughtsman.
2 Engineering Mechanics.
1 Ditto for Bridging.
3 Clerks.
1 Draughtsman.
4 Engineering Mechanics.
1 Ditto for Bridging.
3 Permanent-way Sub-Inspectors.

Total ... 20

Native Non-Commissioned Officers.

3 Permanent way Sub-Inspectors.
30 Mates of Gangs.
5 Artisans and Mechanics.

Total ... 38

Native Soldiers.

10 Artisans.
20 Trollymen.
210 Gangers.
1 Daftari.
4 Peons.

Total ... 245

Grand Total ... 303

C.—No. 3 Company, Locomotive Department.

Officers.

1 Locomotive Superintendent.
2 Assistant ditto.

Total ... 3

Native Officers.

1 Subadar.
2 Jemadars.

Total ... 3

European Warrant and Non-Commissioned Officers.

3 Running Foremen.
3 Workshop Foremen.
1 Accountant.
3 Clerks.
1 Head Draughtsman.
5 Engine-drivers.
1 Carriage Foreman.
1 Carriage Examiner.
1 Shunter.
2 Head Mechanics.

Total ... 21

European Soldiers.

15 Engine-drivers.
2 Upper Firemen.
1 Draughtsman.
20 Artisans and Mechanics.

Total ... 38

Native Non-Commissioned Officers.

2 Clerks.
1 Assistant Carriage Foreman.
1 Ditto do. Examiner.
2 Native Shunters.
8 Head Native Mechanics and Artisans.
6 Head Khalassies.

Total ... 20

Native Soldiers.

40 Shunters.
50 Artisans.
60 Khalassies.
40 Firemen and Jacks.
1 Daftari.
4 Peons.

Total ... 195

Grand Total ... 280

D.—No. 4 Company, Traffic Department.

Officers.

1 Traffic Superintendent.
1 Assistant Traffic Superintendent.

Total ... 2

Native Officers.

1 Subadar.
1 Jemadar.

Total ... 2

European Warrant and Non-Commissioned Officers.

8 Station Masters.
1 Head Clerk.
1 Assistant Clerk.
1 Traffic Inspector.
8 Guards.

Total ... 19

European Soldiers.

12 Guards.
6 Clerks.
6 Station Masters.

Total ... 24

Native Non-Commissioned Officers.

15 Native Station Masters.
8 Head Pointsmen.
3 Clerks.

Total ... 26

Native Soldiers.

20 Native guards (breaksmen).
5 Daftaris and Peons.
40 Pointsmen.
12 Khalassies.
3 Clerks.

Total ... 80

Grand Total ... 153

Total strength of battalion (all ranks), 947.

Such being the railway strength of the four companies, the constitution of the battalion from a military point of view will be as follows :—

EUROPEAN OFFICERS 11.

1 Lieut.-Colonel (*Manager*).
1 Major (*Executive Engineer*).

4 *Captains.*

1 Assistant Manager (No. 1 Company).
1 Assistant Engineer (No. 2 Company).
1 Locomotive Superintendent (No. 3 Company).
1 Traffic Superintendent (No. 4 Company).

5 *Lieutenants.*

1 Assistant Superintendent of Telegraphs (No. 1 Company).
1 Assistant Engineer (No. 2 Company).
2 Assistant Locomotive Superintendents (No. 3 Company).
1 Assistant Traffic Superintendent (No. 4 Company).

NATIVE OFFICERS 10.

4 *Subadars.*

1 Inspector of Police (No. 1 Company).

The remainder must be borne on the staff of battalions for military duties only, unless they are found qualified for responsible railway appointments.

6 *Jemadars.*

1 Sub-Inspector of Police (No. 1 Company).
2 For No. 2 Company
2 „ No. 3 „
1 „ No. 4 „
} These, like the Subadars, must be borne on the battalion staff.

EUROPEAN WARRANT AND NON-COMMISSIONED OFFICERS AND PRIVATES.

WARRANT OFFICERS 13.

No. 1 *Company*—4.

* 1 Travelling Inspector of Accounts.
1 Head Storekeeper.
1 Sub-Assistant Superintendent of Telegraphs.
1 Head Clerk to Manager.

No. 2 *Company*—4.

1 Superintendent of Maintenance.
1 Engineering Mechanic.
1 Do. for Bridging.
1 Head Draughtsman.

No. 3 *Company*—3.

1 Running Foreman.
1 Workshop Foreman.
1 Carriage Foreman.

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* Should be entered under heading of Pay Establishment.

No. 4 *Company*—2.

1 Station Master.
1 Traffic Inspector.

SERGEANTS OR LANCE-SERGEANTS 25.

No. 1 *Company*—5.

1 Clerk to Assistant Superintendent, Telegraphs.
2 Telegraph Masters.
1 Assistant Clerk to Manager.
1 Sub-Storekeeper.

No. 2 *Company*—4.

1 Assistant Superintendent of Maintenance.
1 Head Clerk.
1 Engineering Mechanic.
1 Permanent way Inspector.

No. 3 *Company*—9.

2 Running Foremen.
2 Workshop Foremen.
1 Accountant.
1 Head Draughtsman.
2 Engine-drivers.
1 Head Mechanic.

No. 4 *Company*—7.

1 Head Clerk.
3 Station Masters.
3 Guards.

CORPORALS AND LANCE-CORPORALS ?

No. 1 *Company*—6.

1 Assistant Clerk.
1 Sub-Storekeeper.
2 Telegraph Masters.
2 Telegraph Sub-Inspectors.

No. 2 *Company*—12.

1 Assistant Clerk.
3 Sub-Clerks.
1 Draughtsman.
5 Engineering Mechanics.
2 Permanent-way Inspectors.

No. 3 *Company*—9.

3 Clerks.
3 Engine-drivers.
1 Carriage Examiner.
1 Shunter.
1 Head Mechanic.

No. 4 *Company*—10.

4 Station Masters.
1 Assistant Clerk.
5 Guards.

EUROPEAN PRIVATES—90.

No. 1 *Company*—28.

12 Clerks.
15 Telegraph Signallers.
1 Battery man.

No. 3 *Company*—38.

15 European Drivers.
2 Upper Firemen.
1 Draughtsman.
20 Artisans and Mechanics.

No. 4 *Company*—24.

12 Guards.
6 Clerks.
6 Station Masters.

NATIVE NON-COMMISSIONED OFFICERS AND PRIVATES.

HAVILDARS AND LANCE HAVILDARS—33.

No. 1 *Company*—5.

3 Clerks.
2 Head Constables.

No. 2 *Company*—14.

3 Permanent-way Sub-Inspectors.
10 Mates of Gangs.
1 Mechanic.

No. 3 *Company*—8.

1 Assistant Carriage Examiner.
1 Assistant Carriage Foreman.
1 Clerk.
1 Assistant Shunter.
4 Head Native Mechanics and Artisans.

No. 4 *Company*—6.

5 Native Station Masters.
1 Clerk.

NAIKS AND LANCE NAIKS—63.

No. 1 *Company*—7.

3 Clerks.
3 Head Constables.
1 Daftari.

No. 2 *Company*—24.

20 Mates of Gangs.
4 Artisans and Mechanics.

No. 3 *Company*—12.

1 Clerk.
1 Assistant Shunter.
4 Head Native Mechanics and Artisans.
6 Head Khalassies.

No. 4 *Company*—20.

10 Native Station Masters.
1 Head Pointsman.
2 Clerks.

NATIVE PRIVATES*—651.

No. 1 *Company*—131.

91 Railway employés.
40 Telegraph employés.

No 2 *Company*—245.

245 Railway employés.

No. 3 *Company*—195.

195 Railway employés.

No. 4 *Company*—80.

80 Railway employés.

PAY ESTABLISHMENT—7.†

1 Paymaster (*Examiner of Accounts*).
1 Assistant Paymaster (*Head Accountant and Warrant Officer*).

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* For details consult List No. I.

† Such an establishment is, of course, not required for the mere pay-work of the railway battalion, as a military body, but for the Railway Accounts, Pay, &c.

Sergeants.

1 Paymaster Clerk.
1 Cashier.

Corporals.

2 Assistant Accountants.
1 Assistant Paymaster Clerk.

MEDICAL STAFF—7.

1 Surgeon.
1 Apothecary (*Warrant Officer*).
1 Hospital Assistant (*Native*).

European Privates.

1 Compounder.
1 Dresser.

Native Privates.

1 Compounder.
1 Dresser.

Grand Total (all ranks) 947 exclusive of military staff.

Grand Total of corps 2,841 of all ranks except military staff officers and non-commissioned officers.

II

RAILWAY AND TELEGRAPH CONSTRUCTION COMPANY.

A.—RAILWAY SECTION. EUROPEANS.

3 *Officers.*

1 Executive Engineer (Major in Command).
1 Assistant Engineer (Captain).
1 Assistant Engineer (Lieutenant).

3 *Warrant Officers.*

1 Superintendent of Maintenance.
1 Engineering Mechanic.
1 Engineering Mechanic for Bridging.

4 *Sergeants and Lance-Sergeants.*

1 Assistant Superintendent of Maintenance.
1 Engineering Mechanic.
1 Head Clerk.
1 Permanent-way Inspector.

10 *Corporals and Lance-Corporals.*

2 Draughtsmen.
4 Engineering Mechanics.
2 Clerks.
2 Permanent-way Inspectors.

NATIVE RANKS.

10 *Havildars and Lance Havildars.*

3 Permanent-way Sub-Inspectors.
5 Mates of Gangs.
2 Mechanics.

22 *Naiks and Lance Naiks.*

15 Mates of Gangs.
3 Head Constables.
4 Artisans and Mechanics.

244 *Native Privates.*

200 Gangers.
30 Railway Police and Watchmen.
10 Trollymen.
4 Daftaris and Peons.

Total ... 296

B.—TELEGRAPH SECTION.

See above pages 40—41.

C.—MOUNTED SECTION.

1 Captain (Assistant Engineer).
1 Warrant Officer (Engineering Mechanic or Superintendent of Maintenance).

3 *Sergeants.*

1 Assistant Superintendent of Maintenance.
1 Permanent-way Inspector.
1 Assistant Engineering Mechanic.

3 *Corporals.*

1 Assistant Engineering Mechanic.
1 Permanent-way Sub-Inspector.
1 Telegraph Sub-Inspector.

4 *Havildars.*

2 Permanent-way Sub-Inspectors.
2 Mechanics.

8 *Naiks.*

5 Mates of Gangs.
2 Head Constables.
1 Telegraph Signaller.

80 *Native Privates.*

20 Railway Police and Watchmen.
50 Gangers.
10 Telegraph Line men.

Total ... 100

NOTE.—The battalion military staff is as given above on pp. 44—45.

The great preponderance of European non-commissioned officers over European privates seems quite unavoidable. These non-commissioned officers can be employed in supervising the drill and training of the Native as well as the European privates, under the orders of the European officers. They will be most useful in the Railway Construction Company to command and control the native soldiers. Care must of course be taken that the functions of the European non-commissioned officer do not clash with those of the native officer and non-commissioned officer.

The railway police and line watchmen may be advantageously trained as part of the Construction Company, especially of the mounted section. With this object in view a certain proportion of them should be drawn from the native cavalry.

All ranks of the railway corps can be brought up without expense from any part of the line to corps or battalion head-quarters for the annual courses of military drill and railway and telegraph construction training.

Officers being few in each battalion the warrant officers will be available to take their places in time of need.

MUSKETRY INSTRUCTION.

By Free Lance.

The author of that splendid work "Infantry Fire Tactics" towards the end of his book has a chapter on Musketry Regulation and Instruction, saying that our present system is wrong because we went in for individual firing, which in modern warfare is of little account, and we have been trusting too much to a supposed superiority of weapon which is also of little account unless there is a well-instructed man behind it.

In my paper I will go further than Mayne, and what I am about to propose will, I know, strike all who are wedded to "musketry" in this sense of the word, and which to them means nothing more than "Ranges," "Targets," "Returns" and "Figure of Merit." Mayne strikes heavily at our present system; I would give it its deathblow. He says truly we have no fire discipline, and are only just awakening to the fact. This lack of fire discipline was noticed by the foreign officer at Delhi, and it is noticed by some of our best general officers, but this is only what must be expected of all troops who are bred to the system of target-shooting and who look upon a good figure of merit as the acme of excellence. Let us then adopt some other system which will give us the discipline so much needed, and without which troops are led to *useless slaughter*.

My proposal is that *range* firing and *target practice* should only be for recruits, who, until he can shoot well, should be kept at it till he thoroughly knows what his rifle can do, and himself how to do it; *then from the time he is passed into the ranks he should never fire a shot again at a target* but should go through, monthly, a course of field firing and instructional firing. By the latter I mean long range volley, rapid volley and mass firing with use of different sights; all these practices not to be at targets but at objects and distances and circumstances as like real warfare as possible.

The field firing to be as thoroughly practical as possible on a carefully and *intelligently* prepared position (not as is usually seen at most stations, targets and screens of absurd dimensions placed in such absurd positions that an enemy would be a fool to occupy). Again field firing with 10 or 20 rounds of ammunition is absurd; they should have at least 50 rounds per man. Let each stage of attack be carefully conducted, the number of rounds fired carefully considered, and after each stage let certain percentage of men and officers fall out to represent casualties, so that the reinforcing of the attacking line may be done under circumstances as like the real thing as possible. When the attacking line has reached

a stage 500 yards from an enemy, when after such an attack, ammunition begins to run short, let it be replenished and attack resumed. When the decisive distance is reached let a very heavy *independent* fire be kept up to twenty rounds; then "cease fire" to rush the position, all the fire *before* this period being controlled fire; at the decisive distance the fire will of itself emerge into independent, so it is better to cause order out of disorder.

Such attacks, practised and properly carried out every month, will, until those principles of fire discipline which are so shortcoming with us and by being constantly practised, become habitual, habit becoming second nature.

Our troops and companies should be divided administratively and tactically into recognized groups, each under its own non-commissioned officer. These again should be thoroughly trained in all the important duties of section and group leader, most especially so in those of collective firing. The essence of my proposed system is thorough instruction and thoroughly reliable non-commissioned officers; these are the backbone of any army; every trouble should be taken to make them thorough "soldiers"—the British army translation of a good non-commissioned officer being, I am afraid, mostly a "good clerk."

It is a well-known fact proved by modern battle that, when once a line gets engaged, the control of the fire passes into the hands of the practised leaders, the company officers giving the general directions; but it is the group leaders that really control the fire, hence it is easy to see how their education on fire discipline will control the fire. If the education has been perfect, and comes to them as a matter of every-day life, the control will be perfect and consequently the fire deadly; if the education is imperfect, and the discipline only resorted to in the day of battle, the fire will be erratic and wasted, and the result, deadly slaughter and repulse.

Such a system will open a new era for the British army; it will no longer be the bye-word for wild firing and lack of fire discipline. Let us candidly take to heart the criticisms of the foreign officers, remembering they have been through the fiery ordeal of modern battle and have deeply and earnestly studied the subject. We have no such vivid experiences to go on.

We know the splendid material we have for making the best soldiers in the world; let us teach them in a manner that all the excellence will be doubly useful. The time is coming nearer than perhaps most of us imagine, when we shall have to enter on a campaign against the disciplined soldiers of Europe (not ignorant, ill-armed savages). We could not do so with "light hearts," but anyhow let us do so knowing that everything has been done to make the machine perfect in every sense, and then with our men's stout hearts, and their perfect discipline, bring them through the fiery ordeal, with the battle flag of old England still to the front in victory. God forbid that it ever should be in defeat. We cannot muster our soldiers in millions like Continental nations; the more reason for us then to make the few we have as perfect soldiers as possible. "Fire is everything."

I would propose abolishing musketry prizes as they are at present, and would substitute the following :—

One prize to the best battalion in the Presidency in field and collective firing.

One prize to the best troop or company in a regiment for the same.

One prize to the best section or group in a company for the same.

Let the individual emulation be kept up by good shooting and matches not by Government prizes, which should only be for field and collective firing. Let all the field firing be arranged by a committee of officers to ensure it being done practically. At present in most stations it is most *unpractical* ; most absurd targets and screen placed in as absurd positions, which no enemy, however savage, would dream of occupying—the results of such field firing must be fictitious. I would here make a suggestion with reference to Native Army Musketry Regulations as they are at present. It is well known that in every regiment there are a number of men who are useless as soldiers ; not only can they not shoot but are useless in every respect. Now why are these men kept on ? A special clause in the Pension Regulations called clause (*c*) can get rid of these men, that is, if they are qualified for pension by service ; but what is to be done with men who are under 15 years' service, and whose presence as useless men is an encumbrance to these regiments, because year after year these men are practised, and year after year fail to pass out of second class, and hence destroy, as regards the " figure of merit," the exertions of their comrades in shooting ? These men cannot be got rid of unless they claim their own discharge ; they become a bad example to their comrades, and draw Government pay as useless men. Now I would suggest a special clause being inserted in the Native Army Musketry Regulations authorizing a Commanding Officer summarily discharging from the service any man of less than 15 years' service who fails after two annual courses to pass out of the third class provided he is a useless soldier in other respects. The Commanding Officer will hail with delight the order, and the State will be saved the expense of paying a useless man. The above is of course with reference to the present system *in view* ; *the presence of such men would be impossible*, as such men could not be in the ranks, as they would have been turned out *when recruits* as failing to come up to the required standard.

I would further recommend that *all* native officers and non-commissioned officers of native army be made to pass through a school of musketry and get company certificate *to ensure having perfect instructors.*

In continuation of the above remarks I will now go a little more into details. In the first place the system depends, hangs and lives on the thorough efficiency of the non-commissioned officers.

It should be insisted that every non-commissioned officer of the native army go through a course of instruction at a school of musketry, in the same way that non-commissioned officers of British regiments do ; also that no non-commissioned officer be ever permitted to command a section or

group unless he is certified as an efficient instructor, and that a knowledge of reading and writing, the former certainly, be a *sine quâ non* for a non-commissioned officer.

Good drill is the foundation of good shooting and musketry. By good drill good discipline is inculcated, that is men will do what they are told at once and with precision. I am convinced that where there is bad shooting, there you will find bad drill. It stands to reason that men will not shoot well if they don't know their firing exercise properly. If this were not the case, why is it that at the school of musketry it is the first thing they put you to?

Each regiment should go through four practices in field firing once a year. (I had intended that it should be once a month, but I know the old cry of expense would come in.) At each practice 50 rounds of ammunition should be fired to accustom the officers and group leaders in all the phases of attack, and the men to the bodily and mental strain that are necessary in the attack, thus—

1*st* *Stage.*—	1,200 to 900 yards	(preparation)	15	rounds.
2*nd* *Stage.*—	900 to 700 „	(„)	10	„
3*rd* *Stage.*—	700 to 400 „	(fix bayonets)	10	„
4*th* *Stage.*—	400 to 200 „	(*crisis*)	15	„

Fire in volleys with fixed sight at 400 yards; aim to be taken at bottom of objectve, followed by ten rounds rapid independent fire with the same fixed sight, and some aim followed by cease fire, hurrah and rush. Each troop and company should also be practised every two months in the following *instructional* firing:—

Long Range Volley.—On prepared ground 15 rounds.

2,000 yards 5 rounds.
1,500 „ 5 „
1,000 „ 5 „

After the fire is over each unit should be marched over the ground to observe the effects of their fire; in this way the men would become alive to the effect of it.

Rapid Volley Firing.—On screens representing squadron of cavalry at 800 yards, 500 yards and 300 yards.

Three volleys to be delivered by groups independently, one at each of above distances, in two minutes. This practice to represent the requisite celerity of fire necessary to meet the charge of cavalry—a squadron taking about two minutes to gallop over 800 yards of ground.

Volleys at changing objectives.—At screens representing cavalry placed at three distances, 900 to 500 yards, at an angle to original front, and the volleys to be delivered without shifting position; thus,—

1st Volley at 900 yards half left.
2nd „ at 700 „ to the front.
3rd „ at 500 „ half right.

Volley and independent firing as performed during the crisis of attack, *i.e.*, five volleys by group, then ten rounds rapid independent fire followed by "cease fire," and rush with fixed bayonets; five volleys by

groups at lines of screens from 6 feet to 2½ feet dispersed over ground between 400 yards and 200 yards; after this the line of screens at 200 yards 2½ feet high increase, and then ten rounds very rapid independent firing.

It would be more instructive if in front of the 200 yards line some damp grass were collected and set fire to, so as to represent the smoke that hangs on the edge of infantry heavily engaged.

The five volleys and the ten rounds independent to be fired with a fixed sight at 400 yards, and aim in all cases at the foot of objective or the bottom edge of the smoke, followed by cease fire repeated by the *whistle* of group leader, and rush made with fixed bayonets.

All the above practices should be carried out by companies separately, so that it may be conducted carefully and instructively. The men after firing to be invariably taken over the ground to note the effects of their fire.

Marksmen Practice.—Five rounds in single shots at figures representing solitary horsemen reconnoitring at distances varying between 1,500 and 1,000 yards.

Three rounds in volleys at screens representing masses of cavalry and artillery at 1,000, 1,500 and 2,000 yards.

Judging Distance.—For all officers and non-commissioned officers and marksmen, once every month at distances varying from 400 yards to 1,500 yards.

It is no use making men do judging distance (though they should go through judging distance drill when recruits), as they should *never be allowed to fire on their own account.* Every kind of fire to be in the hands of officers and group leaders, the distances being invariably given by them, hence the absolute necessity for these being proficient in judging distance.

The use of the Stadiometer to be abolished, and a good, simple, easily-worked instrument *under* fire, and as such the Lobbez or Bates to be officially recognised instruments.

Revolver Practice.—For all who are armed with that weapon to be compulsory and shewn in returns.

36 rounds once every quarter, *i.e.*, 12 rounds continuous practice at 15 yards, 6 with right hand and 6 with left.

12 rounds single practice at 20 yards, 6 with right and 6 with left hand.

12 rounds single practice at 25 yards, 6 with right and 6 with left hand.

Whistle Practice.—Every officer and non-commissioned officer should be thoroughly instructed in the whistle. All movements of attack to be conducted by whistle only, the bugle being the officer commanding the regiment's call. A special signal should be adopted for fixing bayonets, which, if not given, should be ordered when the 400 yards stage is reached.

Replenishing Ammunition.—This is the most important of an attack, and every means should be adopted to practise some good method, so

that men may be in the habit of doing so whenever the attack formation is used.

The following seems a fair way :—

Each company should have a staff of 16 men, *i.e.*, supposing a company be divided into four sections, and section into two groups, there will be eight groups per company ; there should be two men per group as ammunition servers.

All the servers should keep together so long as the company acts united, but separate immediately the company extends for attack, each pair of servers following behind their respective groups.

Each pair of servers should carry between them a canvas bag with a couple of handles ; each of these bags should contain 20 packets of ten rounds each. Each server should in addition have a smaller canvas bag capable of containing ten packets. When the signal for fresh ammunition is made, one of the servers fills his personal bag, runs up into the firing line, and serves out. When the group servers find they are running short, signal should be made to the regimental ammunition reserve, but they themselves should never leave their places behind their groups. They should also be instructed to collect the ammunition of the killed and wounded as they are struck down. It would be as well to have extra men told off as a reserve to the group servers to provide for casualties amongst them. I think this extra 20 rounds per man, in addition to what the men already carry on their person preparatory to entering into action, should be enough. On the defence more ammunition would be required, and the means of replenishing it are more easy than in attack.

Entrenching Drill.—From what we have read of recent battles it seems that troops attacking will have to resort to hasty spade work to fasten on to ground already gained. The sooner our men are given *each* a light entrenching spade the better, so that when the destructive game of fire is reached, or whenever the attack checks the men, they can get rapidly into cover even of the highest description.

The officer should be specially trained to adopt the shelter trench to the form of ground, so that the greatest tactical use may be got from it.

No one who has read of Skobeloff's attacks at Plevna will doubt the use of the spade in the attack. Here the troops were continually defeated till the spade helped them.

It will be seen that my system is the group system, and I feel convinced that it is the only system under which random fighting can be carried out, and is more especially adaptable for our troops. This system *exists* on the thorough efficiency of officers and non-commissioned officers. Each group of a company should have its own leader, and if he is unavoidably absent or is struck down, his place should be at once filled by the senior man of the *same group*, so that the men will always have an accustomed voice and presence before or behind them. Let the greatest rigour be exercised in the selection of these group leaders, and all incompetent men got rid of without favor or affection.

All groups should especially be trained to *combine* under a common impulse in a *forward* movement ; no backward movement should *ever* be made *without express order*.

There are men in every rank who will be more forward than others ; these are the gallant hearts that inspire vigor into the attack wherever their presence may be, and it is these impulse *forward* that officers should watch for and timely support. " En avant," press on, heap on fire, get to the decisive distance, and combine a heavy fire, the crisis must come, one must give way, and woe to one that does.

" *No battle has ever been won from long range fire.*"

Rallying is another important part of the attack, and should regularly be practised ; it is a well known fact that the body of men which have just carried a position is more or less spent ; now comes the time to rally quickly, pursue the foe with volleys, look out for counter-attack, and fasten on to the position gained.

By such a system of instruction the company and group commanders will acquire a rare facility in handling their various commands ; vigor and precision will be the result, and the men from being in constant habit will acquire promptness and celerity, and the fire will be from the same habit controlled and deadly.

What is still further required is that all superior officers should acquire the necessary tactical ability in handling masses of men. I would recommend that during the drill season *all* the *field officers* of a brigade have a turn at command, and after each field day the general officer assemble the officers and point out mistakes and mention those who did well ; let emulation and *professional* zeal be inculcated. Now-a-days a field day is looked on as a prefect bore, and the troops consider themselves *uselessly* worried. All brigades and divisional drills should be with a part of the force as enemy, so as to give *a point* to the instruction.

It will only be by very careful preparation that we shall be able to come up to the continental requirements of good fire discipline ; it cannot be made a makeshift of to suit the occasion ; it must be carefully prepared, learnt and carried out by *constant habit*. It stands contrary to all past lessons that men will ever do anything that is pitched on to them at the last moment.

No army that is bred to *target-shooting only* will ever acquire good fire discipline, because all its requirements are unfitted for the mental and physical strain required in modern fighting. The object, distances and condition are *totally* different.

Let us regret the old fad, and adopt practical firing under conditions as much like real service as possible ; let officers and men become habituated to the efforts that will be required of them, and then we shall see attacks promptly, vigorously and decisively carried out. Let us develop that coolness and dogged tenacity for which the British soldier is fond, and give him that fire discipline he so much needs ; then let the next campaign come, we may feel sure that the machine is well oiled and ready.

Can we feel sure of the machine now ? The sooner the native army is armed with the same weapon as the British soldier the better, and if *target-shooting* and a *figure of merit* is still to be the criterion of

excellence, the sooner the native musketry regulations are revised the better; *everything* should be *provided for* and distinctly set forth; at present there are many loop holes for fictitious firing. It can never be ascertained that any two regiments have fired their annual course under precisely the same condition (I don't mean weather). Very great laxity in deciding what is legitimate or illegitimate exists. This I put down to the *figure of merit*; the proficiency, *save the mark*, of a regiment depends on its figure of merit; *how* it is obtained is quite another matter, so long as it *is* obtained. I say again that the figure of merit is fictitious and does not tell the real proficiency of a regiment, and till the regulation can lay down a standard system of firing the annual course even to minute details, you can never depend on the so-called figure of merit.

In the native army the want of fire discipline is much felt. The stricter the discipline inculcated in time of peace the better will the result be in time of war; too much praise cannot be taken. We must recollect that, however good our native troops are, or we suppose them to be, they have still their "baptism of fire" (modern fire) to go through. We all know too how anything like sudden and severe loss is likely to affect the native mind: we also know too what a native is when he is suddenly ordered to do anything he has hardly ever done before. Let us then avoid the chance of anything like confusion or panic, by constantly drilling men and non-commissioned officers into habits of controlled fire, and acquire that discipline which is so indispensable for modern fighting. Let any one go into the firing line of a native regiment, and he will be convinced. Of course some regiments are better than others, but the exceptions are few. There are no men in the world such creatures of *habit* as a native of Hindustan. This appearance of of being *wound up* is apparent in any regiment. Let the slightest difference be made in the winding up, and see how the clock goes. One of the foreign officers at Delhi told me that he particularly noticed in a native regiment that during the attack, as long as the British officer was present and directing, things went well, but that if his voice and example were absent, and the native officer had the control, the attack lost energy and discretion and the fire got wild. These remarks were made to me by one of the keenest of our critics. I am convinced he saw truly, but I did not tell him so.

We must *thoroughly* train the native officer and non-commissioned officer and insist on thorough competency, without which it is useless attempt to instil fire discipline into the men. The native soldier looks to his leader for orders and example. If they distrust the capability of their leader they are no longer soldiers, but become a rabble; one of the chief objections to my system will be that of expense, but for the extra expense I can supply extra proficiency. Is it always to be the miserable policy of "spare the expense and let proficiency go to the dogs?"

When a man HAS to fight for *his riches*, what is the use of his wealth to him if his sword fail him in the hour of need? He may indeed *buy his enemy off*, but at what loss?

THE SUPPLY OF AMMUNITION TO INFANTRY ENGAGED ON THE OFFENSIVE.

By Captain H. Faithfull, *D.A.A.G. for Musketry.*

The great importance of the supply of ammunition to infantry on the offensive, though it has often been alluded to in our military papers and journals, is one which we have never yet thoroughly grasped, presumably because its vital necessity has never been experienced by us. Even in the Franco-Prussian war there were several instances of defect through want of ammunition only: the troops defending St. Privat fired away all their cartridges, and had to retire purely for want of ammunition, and at the action of Champigny the French had 108 rounds per man, which were nearly all used up and they had to retire. All continental authorities are unanimous on the two following points: First, that a certain proportion of the troops, though not all, told off for an attack, must be provided with an enormous increase of ammunition over and above the quantity carried by the men under ordinary circumstances in the field—some even considering the total carried should be as high as 200 rounds per man. Second, that no ammunition wagon or pack animal can possibly be brought up to an engaged fighting line, and therefore there must be some special provision to meet this difficulty.

Chapter XII of Captain Mayne's Infantry Fire Tactics is devoted to discussing the supply of ammunition on the field of battle, and that portion of it dealing directly with the supply to infantry engaged on the offensive, after recapitulating the various methods devised by continental nations to meet this supply, goes on to say: "Our regulations are quite silent concerning the connection which exists between engaged troops and the battalion ammunition carts." And a little further on: "Nothing has been clearly laid down on the very important question of how cartridges are to be brought to the men from the battalion ammunition reserves. This is the knotty point, and Captain Mayne states that all continental nations have found it to be an almost insoluble problem, but at the end of the chapter in his resumé he lays down certain points to be observed in devising any method to render the supply of ammunition on the battle-field as perfect as possible. It is from the hints contained in the first two paragraphs of this resumé that I have worked out the following plan, and as so far as I am aware no method of meeting the difficulty based on these lines has yet been made public, I hope I may be pardoned for venturing to suggest one.

In our army every detail is minutely described, from the manufacture of the component parts of the cartridges, through the various channels these have to pass to arrive with a battalion on the field of battle, either

in the pouches of the soldiers or in the cases carried by the first regimental reserve of ammunition ; but from the moment the battalion forms for attack, these last-named cartridges of the first reserve are left rather to themselves to find their way from their carriage to the pouches of the men who will require them, for, excepting some circulars that are not very generally known in the army, and that deal somewhat vaguely with this part of the question, no orders that I have seen have been issued on the subject. According to A. G.'s Circular Memo. No. 2401E, dated the 9th October 1884, the place of the first reserve of ammunition is laid down as immediately in rear of the battalion in column of route, and directly the fighting formation is assumed the Pioneers take charge, and under the direction of the sergeant conduct the mules to the rear of the reserve companies and await orders, &c. &c. The only mention directly made of the way the cartridges are to reach the men is in the 3rd paragraph : " And when a demand is made from any part of the fighting line, a Pioneer will be sent with his three mules to the spot where the ammunition will be distributed by the supernumerary rank : the Pioneer will then take the mules back to where he came from, &c., &c." And at the end of this circular comes the para. : " It is thought that the above system will be sufficient for all practical purposes, all details being left to be filled in by commanding officers on the spot according to varying circumstances."

At the late Delhi Camp of Exercise it was seen how very indifferently the first reserve of ammunition was attended to, and under the orders of His Excellency the Commander-in-Chief, attention was drawn to the very careless way the mules carrying this reserve were brought up over perfectly open ground under a heavy fire.

Now Captain Mayne (page 272) very reasonably argues out the inadvisability of supplying the fighting line by means of men moving between it and the ammunition supply ; for besides the very small quantity such men can take up to the fighting line he says (page 273) : " It is very unfair to expect men to cross and recross a fire swept by one simply carrying ammunition, and it is more than probable that, when once these men reach the fighting line, they will remain there even if their own rifles have been left behind, for they can get rifles from the dead and wounded men. Men should not be taken from the firing line to the rear to find ammunition, and the officers in the fighting line have quite enough to occupy their whole attention in conducting the advance of the firing line without having to think whether their ammunition is running short or will suffice. All arrangements for replenishing the emptying pouches of the firing line must be made from the rear, for those behind can very easily observe, by the intensity of the fire in front, when the firing line is likely to require a fresh supply of ammunition. All these inconveniences are best met by taking the men for supplying ammunition from the supports and reserves.

The infantry soldier's service coat should be provided with two pockets, to hold at least in each pocket two and as many as four packets of ammunition of ten rounds each. A step in the right direction has been

taken in ordering the service coat to be provided with bandolier pockets, but more is required, and I venture to suggest a pair of pockets similar to those on a Norfolk jacket, capable of containing four packets each, and the men should be instructed always to use any extra supply they may have distributed before they fire away a single round out of their pouches, for by so doing they will always know when that extra supply is fired away that they still have their ordinary supply to fall back on.

At present our first reserve of ammunition is carried at the rate of thirty rounds per man, on the paper strength of a battalion, but as the men actually present on going into action are always far below this strength owing to depôts, guards, sick, &c., &c., it may be allowed that this first reserve is actually sufficient for 40 rounds per man going into action ; but this is not enough, for Captain Mayne (page 269) states : " Each soldier will require at least 120 to 150 rounds in the preparation of an attack to overcome the efficacy of the enemy's fire, which alone prevents an assault being given": this first reserve should therefore be carried for 50 rounds per man instead of 30 as at present.

In attacking an enemy on the defensive, the supports must join the fighting line, and the reserves too will have been merged in this line before a sufficient effect will have been produced to enable this fighting line, encouraged by the near approach of the second line, to rush the enemy's position. Now, as both supports and reserves of the attacking battalions have to join the fighting line, and as each approximately equals the line it reinforces, the supports equalling the fighting line and the reserve these two together, I propose to make these supports and reserves bring up the extra supply of ammunition required by the conditions of modern warfare, and so far as Captain Mayne's axioms in his resumé are concerned this method complies with the principles he inculcates.

In column of route, and up to the moment the battalion assumes the attack formation, the first reserve of ammunition accompanies the battalion. The method of distributing this reserve to the men about to engage in an offensive action is as follows : On the command the battalion will extend for attack ; that portion of it told off to form the fighting line should at once have six packets per man distributed to it from the first reserve, each man carrying three packets in each of the two pockets already proposed to be made on the service coat. As the battalion in all probability is not under fire at this stage of the action, the distribution might be carried out by ordering up two mules to each company detailed for the fighting line, and the supernumerary rank of each company assisted by the Pioneers in charge of the first reserve should hand out six packets to each man of the fighting line : the fighting line might then advance, extending on the march, and the portion of the battalion detailed for the supports should have four packets per man distributed to it before it moves on to take its place in attack formation : similarly the reserve should be served out with four packets per man. As the first reserve, at the rate of 50 rounds per man calculated for 800 men, amounts to 40,000 rounds, it would require in even

numbers 34 mules to carry it, so that to quicken the distribution of reserve ammunition eight mules might be detailed to supply the fighting line and six the supports, and the last company of the battalion reserve might wait to be supplied till the fighting line and supports have had their extra ammunition distributed to them in order to empty any "broken" boxes.

While this issue is proceeding the commanding officer might advantageously avail himself of the opportunity to explain the objective of the attack to the officers of the battalion, for, though the field exercises direct that this should be done even on every instruction parade, it is still the commonest thing in the world to find that not a single company commander has the least idea of what the objective is and which is the point he should direct the fire of his company on.

The carriage of the first reserve of ammunition will have been now nearly emptied, and should be sent back to the second reserve to replenish, with orders that when this has been completed it is to return to the place the battalion extended for attack at and to follow up in rear of the second line till the enemy's position has been carried, when it can rejoin its own battalion as it reforms on the second line passing it to carry on the pursuit; and the supply of ammunition now brought up, allowing for ordinary casualties in the attacking battalion, should suffice for another distribution of 60 rounds or even 70 rounds per man.

It may be presumed that the original fighting line of a battalion in attacking will have expended about 20 rounds per man before it will be necessary for the supports to reinforce it to carry it on. As this fighting line had 60 rounds per man served out to it in addition to its 70 ordinarily carried, it will still have as many rounds per man left when the supports come up as these arrive with, presuming it to have fired away 20 rounds per man. Supposing this new fighting line has to expend 40 rounds per man before it becomes necessary for the battalion reserve to reinforce it, it will still have its original supply of 70 rounds per man, and as the reserve comes up with 40 rounds per man extra these reserve men should be instructed to hand over two packets each to each man of the fighting line, and allowing for casualties to have been about equal in the three parts into which the battalion is divided on forming for attack; when the whole battalion becomes merged in one line it will still have 90 rounds per man to carry it over the final stages of the attack—an ample allowance according to all modern writers on the subject.

As the battalion will usually extend for attack at about 2,000 yards from the enemy's position, and it may be presumed that fire will be opened on the enemy at about 1,000 yards, the men of the first fighting line will have had to carry the extra weight of six packets (about 6½lbs.) for, say, 1,000 yards: the supports will have to reinforce the fighting line at about 800 yards, so they will have had to carry four packets (4¼lbs.) for about 1,500 yards, and the reserves will have to carry a similar extra weight for about quarter of a mile more than the supports. Now, considering the vital importance of a full supply of ammunition

to infantry on the offensive, this cannot be urged to be too great a task to demand from the ordinary soldier.

In accordance with all the latest ideas of those continental authorities who have studied the subject, a portion of the force must in future be told off to subdue the enemy's fire before any direct frontal attack can be attempted, and it is to meet the requirements of such a force that the above method has been worked out, which allows for the men first engaged having 150 rounds each, those next engaged 130, and the last to come up 90 rounds per man; and 70 rounds is generally admitted to be ample for the force which actually makes the frontal attack after the enemy has been shaken.

The extra supply of ammunition to troops about to engage could be increased on the above plan to a very great extent by serving out six or even eight packets to each man of the battalion before assuming the attack formation; but the necessity for so great an extra issue would very seldom arise; still, if from the enemy's position, &c., it was previously known that very great resistance would have to be overcome before a direct attack was attempted, such an extra issue might be ordered instead of that advocated above, and to assist the men in carrying the extra load, as this large issue would empty the carriage of the first reserve, it might well be employed in taking back part of the kit carried by the soldier, say his great-coat, when it returned to the second reserve to replenish, and as in replenishing it lightens the loads of the second reserve carriage, the great-coats or whatever was directed to be left behind could be transferred to this second reserve, and as this also is under regimental charge the men would get back their kit on reaching camp.

In fact, in distributing the first reserve of ammunition as above suggested, it would be an advisable plan to direct the men to replace the weight taken off the carriage of the first reserve by their great-coats, and these should be taken to the second reserve to replace the ammunition the first reserve will take away from it. Taking away the cartridges from the first reserve sets free a certain amount of carriage, and the above suggestion of relieving the men of part of the weight they ordinarily carry is but one of many ways this reserve carriage might be utilised, for, amongst others, if it is not thought too great a task to put this extra load on the soldier, it might be employed to assist in the carriage of wounded men to the rear.

Lecture given at the United Service Institution of India, on the 6th May, 1887, by Mr. J. H. B. Hallen, General Superintendent, Horse-breeding Operations in India.

GOVERNMENT HORSE-BREEDING IN INDIA.

Major-General E. F. CHAPMAN, C.B., A.-D.-C., *Quarter-Master-General in India, in the Chair.*

PAST, PRESENT AND FUTURE.

THE late Stud Department was originally established in or about the year 1794 at Hajipur, on the banks of the Gunduk, in Tirhoot, North Behar.

2. In the same year Stud buildings were erected at Poosa, which was considered a better and higher site.

3. Afterwards Stud depôts at Koruntadhi, Buxar and Ghazipur were established in the year 1816.

4. The moist climate and the soil, generally possessing little trace of lime, of Lower Bengal proved unfavorable for horse-breeding; but in the early days of the Department the British frontier did not extend further north, so a more suitable site was not then available.

5. Mr. W. Moorcroft, appointed Superintendent of the Stud Department in the year 1808, was aware of the unsuitability of the climate, and was desirous of removing Stud operations to a locality possessing a drier atmosphere and a soil on which an indigenous horse of good stamp might be found.

The fact, also, of the people of Bengal not being horsemen, but only accustomed to horned cattle, was against horse-breeding. These people had to be induced to follow the pursuit, and, as a rule, were frightened of horses and seldom attempted to ride them. The pecuniary inducement offered to these men to receive mares added much to the cost of rearing stock. Moorcroft was aware of this weak point, and was desirous of establishing, in some suitable spot, a colony of horse-breeders, as his experience led him to believe it would be necessary to do so. Indeed his desire was to place Stud operations in a dry climate, with a suitable soil, and amongst people fond of horse-breeding.

A copy of Moorcroft's pamphlet I hand over to the Secretary for the perusal of the members of this Institution.

6. Darwin, in his work "Animals and Plants under Domestication," Vol. I, page 53, remarks :—

"The horse can flourish under intense heat as well as under intense

cold, for he is known to come to the highest perfection, though not attaining a large size, in Arabia and Northern Africa. Much humidity is apparently more injurious to the horse than heat or cold. In the Falkland Islands horses suffer much from the dampness; and this same circumstance may perhaps partly account for the singular fact that, to the eastward of the Bay of Bengal, over an enormous and humid area, in Ava, Pegu, Siam, the Malayan Archipelago, the Loochoo Islands, and a large part of China, no full-sized horse is found."

7. In the year 1818 a Stud depôt was established at Hapur, and afterwards (in 1843) that of Saharunpur was formed, and at a later date (in 1862) the Home Stud was created at Kurnal.

8. It is to be regretted that, when these latter depôts were formed, those of the Central Stud in Lower Bengal were not abolished, as Stud operations would, in all probability, have been more successful as the climate and soil of Hapur and Saharunpur have proved suitable for horse-rearing, but that of Kurnal, from being situated in the neighbourhood of low lands frequently submerged by canal water, did not prove congenial to horses.

9. The operations then instituted and continued until 1876 were as follows :—

Home.

Nisfi (half) or Assamee (agent).

Zemindari.

10. The first, in buildings on Stud lands, contained stallions, mares, and their produce, till the latter was of an age fit for the army, the market, or for breeding.

11. The second, signifying partnership, consisted of mares, the property of Government, covered by its stallions and reared by the holders of the mares. Detailed particulars of this system will be found in the Final Report of the Special Stud Commissioners (1876), a copy of which I hand over to the Secretary for the perusal of the members of the United Service Institution.

12. The zemindary system consisted in Government stallions distributed in the country to serve mares the property of farmers. It existed to a very limited extent in Lower Bengal, simply because few private mares were kept by the people, their mode of conveyance being by bullock cart or by boat. In the North-Western Provinces, the people being fond of horses, a larger number was found, in some districts of good, in others of poor stamp.

13. The Assamee system was introduced in or about the year 1858 in the North-West districts, and was very properly condemned by the Stud Committee (in 1869), of which General Colin Troup, C.B., was President, "as the plan of giving out Government mares killed the zemindari ones, for all the small farmers got rid of their animals that they may obtain possession of those the property of Government."

A copy of the Report of General Colin Troup's Committee I also hand over to the Secretary for the perusal of the members of this Institution.

In section III of the Final Report of the Special Stud Commission will be found fully detailed the terms of the zemindari system in the North-West Studs, the results produced, and the state of the Stud in 1876.

14. In 1806 the abolition of the Studs, ten years after their establishment, was proposed by His Excellency the Governor-General in Council; but it was thought better to allow more time to duly test them.

15. In 1851 a Stud Committee, presided over by Sir Walter Gilbert, was convened to report whether the Studs should be maintained or not.

16. On account of the outturn of the Stud having proved insufficient for the demands of the army, and unsatisfactory reports of the remounts supplied having been received in the year 1868-69, His Excellency the Viceroy (Earl Mayo) in Council directed that a Committee should be appointed to report on the state of the Studs. The Committee was presided over by Major-General Colin Troup, C.B., and, as will be seen from the Report, the conclusion arrived at by the Committee was that the Stud was "in a most unsatisfactory state, from the following facts:—

(*1st*) The steady decrease in the number of remounts;
(*2nd*) the large proportion of unsound horses;
(*3rd*) the great number of narrow chests and twisted forelegs; and
(*4th*) the very bad results of the Stud operations, as shown by the remounts of the last year (1868)."

17. In the year 1872 His Excellency the Viceroy (Lord Northbrook) in Council ordered a Special Stud Commission to assemble with a view of re-modelling the Stud Department. The measures ordered by the Government of India to be carried out will be found detailed in the Final Report of the Commissioners.

18. Subsequently the orders were modified by the Secretary of State for India in Despatch No. 58, dated 20th March, 1873 (in reply to the Government of India Despatch No. 9, dated 10th January, 1873), wherein the Right Hon'ble the Secretary of State for India records—

"I find in the Report of the Stud Committee, presided over by Major-General Sir Colin Troup, C.B., the following startling conclusions:—

(*a*) That the Stud Department is able to supply only 550 horses per annum to the Bengal army;
(*b*) that the costs of these amounts to either £148 or £219 each, according to the different modes of debiting expenditure to the Department;
(*c*) that the Government Studs have failed to produce any amelioration in the indigenous breed of horses;
(*d*) that Government interference in horse-breeding has completely paralysed private enterprise.

"It further appears in this collection that, while Government, by its breeding establishments, can only supply a troop horse at the

exorbitant price above mentioned, the open market supplies the Punjab batteries with horses from Central Asia *viâ* Kabul at £40 each, the Bombay army with horses from the Persian Gulf at £55 each, and the Madras army with horses from Australia at £57-10 each, though in the latter case the price is enhanced to £91 by the unwise retention of the animals purchased at the Oossoor depôt.

"The Report of the Committee also records practices adopted in the Studs respecting the breeding and rearing of young stock, which are undoubtedly at variance with all the principles admitted as sound by practical breeders in this country. And although such practices have been repeatedly condemned by local enquiry in India, they appear to be chronic in a Government establishment.

"The question of the retention of Studs in India has been frequently raised. In 1806, ten years after their establishment, the Governor-General proposed their abolition; but the experiment was not considered to have been sufficiently tested. In 1851 a Stud Committee, presided over by Sir Walter Gilbert, was directed to consider whether the Studs should be maintained or abandoned. The Committee recommended their retention, but pointed out great past mismanagement. They considered, however, the present system capable of great improvement, which, if carried out, would render the Studs more profitable and capable of supplying a better description of cattle than at present.

"Notwithstanding the recommendation of the Stud Committee, supported as it was by the Government of India, the Court of Directors called for further imformation, and the Secretary of State (Sir Charles Wood) in his Despatch of 12th January, 1860, stated that it was the intention of Her Majesty's Government to keep in their own hands the ultimate decision as to the maintenance or abolition of the Government breeding Studs, and desired that no steps should be taken as to the reformation of the Stud Department until the whole question had been reported on.

"Very favorable reports* were received from India in reply to the repeated demands for information from the Court of Directors and the Secretary of State. In accordance with the Memorandum of the Government of India Sir Charles Wood thereupon, in his Despatch of the 18th October, 1860, sanctioned the retention of the Studs. It appears clearly, however, that the main ground of his decision was the satisfactory and, as it now turns out, illusory information given him as to the cost of a Stud horse. The cost of each description of horse supplied to the army was stated to be—

"Stud horse	...	...	Rs. 674-7-7 (£67).
"Cape horse	...	...	„ 631-7-0 (£63).
"Australian	...	...	„ 905-9-7 (£90).

"* Stud horses were stated to cost less than horses could be bought for in the market; the quality of the animal very well spoken of; and the opinion of Sir George Anson (then Commander-in-Chief) was cited as to the goodness of the stable management in the Studs."

"If the facts had been presented to my predecessor in Council, such as they now turn out to be, I cannot doubt that he would have decided that the sound principle to follow, in order to make India self-reliant in the supply of horses, is to be found in the encouragement to be afforded by Government to private enterprise and not by undertaking themselves the functions of horse-breeders.

"But, although I have arrived at the conclusion that it is inexpedient to maintain the establishment of Government Studs, I am by no means insensible to the advantages that may be obtained by judicious patronage on the part of Government.

"Various favorable breeding districts in India are to be found; amongst these the Punjab, Kathiawar, the valley of the Bheema and Mysore are pre-eminent. If in such localities well-selected stallions are furnished by Government, if agricultural exhibitions be fostered and prizes offered for promising brood mares and young stock, above all if the Government announce that they will be prepared to give liberal prices for any suitable three or four-year-old colt that presents itself, I cannot doubt that the ancient and successful practice of private horse-breeding in India would revive.

"With due notice, and by proper arrangements, a supply of 40 to 50 stallions might be obtained per annum from England of the following classes :—

(1) Thorough-bred English;
(2) roadsters or trotters;
(3) half-breds or hunters;

though, in reference to several remarks as to the latter class that appear in the collections before me, I may observe that not only are no such horses to be procured in the market generally but English breeders greatly prefer as sires either pure thorough-breds or pure roadsters. The facilities offered by the Government transports for conveying stallions to India *viâ* the Suez Canal tend considerably to diminish the price of stallions imported into India."

19. The Special Stud Commissioners completed their labors in 1876, and the recommendations made by them, regarding the future remounting and development of horse-breeding in India, will be found recorded in their Final Report.

20. On the abolition of the Stud Department the Government of India sanctioned the formation of two Departments, *viz.*, Army Remount and Horse-breeding Operations.

21. The Department of Army Remount Operations to be supplied with Australian and Persian horses purchased in the local markets and as many of country breed as procurable.

22. The Department of Horse-breeding Operations to be established on the following principles :—

(*a*) The supply of Government stallions to serve gratis only carefully selected and branded mares;

(*b*) The branding to impose no claim on either side, but to be the condition of using the Government stallion ;

(*c*) The prohibition of the purchase of branded mares by the Native Cavalry or Police ;

(*d*) The liberal grant of prizes at Fairs and Horse Shows, with some slight advantages to the produce of branded mares in competing for prizes ;

(*e*) Some assistance to teach the breeders how to castrate the young stock, and to encourage the practice ;

(*f*) The ready purchase, by Government agents, at remunerative prices, of all horses fit for the service ;

(*g*) The number of stallions to be employed in the breeding districts to be, at present, fixed at three hundred.

23. The results of horse-breeding operations may be briefly stated as—

(*a*) Improvements in the breed of Indian horses to an extent perhaps greater than was expected in the space of eleven years ;

(*b*) Appreciation by native horse-breeders of the principles adopted by the State in developing horse-breeding ;

(*c*) By their being desirous of rendering their mares eligible for mating with Government stallions, and readily bringing them to inspecting officers with a hope of their being approved and branded ;

(*d*) The gradual increase in the number of mares so approved and branded ;

(*e*) Producing improvement in local breeds in suitable districts throughout India ;

(*f*) Inducing natives to breed and rear more horses than heretofore ;

(*g*) Teaching breeders how to properly rear their young stock ;

(*h*) The fact that superior stock is being raised is proved by Native Cavalry Remounts bringing higher prices ;

(*i*) Horse-breeding is increasing in India ;

(*j*) The good condition of stock competing for prizes at Horse Fairs and Shows, whereby improvement in stamp is advanced ;

(*k*) The services of Government Salutris and Castrators being gradually more employed, and thus young geldings have more liberty and a better chance of developing in frame and limbs.

24. It was ordered in 1876 that the officers of the Department should be as follows :—

1 General Superintendent ;

1 Assistant Superintendent, North-Western Provinces and Rajputana ;

1 Assistant Superintendent, Punjab.

And in the year 1881 one Superintendent was appointed for the Bombay Presidency.

25. Mule-breeding operations were afterwards incorporated by the General Superintendent with the sanction of the Government of India; and the number of donkey stallions was limited to 300. Thus horse and mule-breeding have been fostered and encouraged, and the industries have become developed in agricultural districts.

26. Government horse and donkey stallions are distributed in the most suitable districts, and are cared for in accordance with the rules laid down for the guidance of officials in charge. A copy of these Rules I hand to the Secretary for record and reference.

27. The present strength of horse stallions in the Department of Horse-breeding Operations is as follows:—

Classes.	Bengal Presidency.	Bombay Presidency.
Thorough-bred English	73	17
Half-bred English and Norfolk Trotters ...	144	15
Australian	5	1
Arab	79	67
Persian	1	0
Stud-bred	10	0
Turkoman	2	0
Total ...	314	100

28. The stallions best suited for Indian Stud work are English of the thorough-bred and Norfolk trotter or roadster breeds; also the Arabs, and some of those bred in the old Stud Department have proved good stock getters; but as the country-bred mares are generally wanting in size and light in bone of limb, the Norfolk trotter has proved the best sire for giving greater size and improving the bone of limb. In England the thorough-bred horse, when mated to mares of light bone, are found invariably to produce weedy stock; hence it is now the custom to mate half or three-quarter-bred mares, possessing large-boned limbs, with the thorough-bred; and in this way is good-boned stock produced.

We in India have, as above noted, only light-boned mares to breed from, and consequently it is found that the Norfolk trotter or roadster is the best stallion for such mares. The great improvement effected by the use of these sires is generally admitted, but it is thought, by some interested in horse-breeding, that the Norfolk trotter sire is being too much employed, and will cause the stock to become too coarse and heavy. These half-bred horses are really pure half-breds, and possess pedigrees of many generations; thus we can count upon their stamping their produce in a well-marked manner. The stamp of horse represented by the Norfolk trotters, found in the Indian Stud, is one admirably suited for Horse or Field Artillery, or British Cavalry; indeed, if those branches were horsed with and mounted on Norfolk trotter stock, selected according to the respective work required of them, it would be said that they could not

be better horsed. Therefore, by employing these stallions with the country-bred mares, we do obtain improvement in stamp, and can but hope that, by steadily continuing to employ this class of stallion, more improvement will be evidenced in every succeeding generation. It is difficult to understand how stock bred from originally under-sized and under-limbed mares by horses of weight, size, bone, and breeding, considered most suitable, can become coarser and heavier than their sires.

29. The Arab stallion, of high and pure caste, is a grand sire for producing stock with powers of endurance, but, as a rule, the produce by him out of country-bred mares is considered too small for army purposes, and therefore he is at a discount in the eyes of breeders; moreover many of the Arab horses now obtainable in the Bombay market are not of pure breed, having, more or less, Persian blood in their veins; and so, as stock getters, they are not so reliable as the pure-bred Arab.

30. Judging by the results of employing of the few Australian stallions in the Department, they are found, like the English thorough-bred, not able, as a rule, to get good-limbed produce out of country mares.

31. The following number of mares have been branded, during the years noted, in the Bengal Presidency; and at the present time there are 16,487 branded mares borne on the registers of the North-Western Provinces and Punjab :—

Years.	No. of mares branded.
In 1876-77	3,621
In 1877-78	1,733
In 1878-79	2,099
In 1879-80	2,388
In 1880-81	1,738
In 1881-82	2,869
In 1882-83	2,221
In 1883-84	2,393
In 1884-85	1,532
In 1885-86	1,404
In 1886-87	1,019

In Bombay there are 4,705 branded mares on the register. The total number is, therefore, 21,192.

32. An annual increase in the strength of brood mares has been attained, and thereby the number of young stock bred is proportionately larger.

But the number of stallions remains 300, and it has been noted in the Annual Administration Report of 1885-86, which I place on the table for the perusal of members, that the overtaxing of the powers of the horses must not be permitted as such an error will lead to many mares going empty and stallions becoming ruined.

It is hoped that the Government of India will grasp the necessity of providing a due number of sires, or allowing, as suggested in the Annual Administration Report above alluded to, that local Governments from District Funds, in those districts where the demand for more stallions is valid, may provide the additional horses required.

33. The number of country-bred remounts purchased during the last ten years has been as follows :—

YEARS.	For British Artillery and Cavalry.	For Native Cavalry.	For Police.	Total.
1877-78	72	907	221	1,200
1878-79	88	2,307	211	2,606
1879-80	117	Returns not complete.	129	Returns not complete.
1880-81	30	1,704	145	1,879
1881-82	39	755	100	894
1882-83	60	1,659	88	1,807
1883-84	128	1,196	72	1,396
1884-85	130	1,176	65	1,371
1885-86	117	3,239	54	3,410
1886-87	Returns	not yet	received.	

34. As horse-breeding operations develop in India so will the number of available and suitable country-bred horses increase; and it may be hoped that, by Government steadily adopting the principles laid down in connection with the fostering of Indian horse-breeding, by the providing of good stallions, awarding money prizes and medals to the owners of the best of country-bred stock by Government stallions out of approved and branded mares, and purchasing all stock suitable as remounts at remunerative prices, in the course of a few years a sufficiency of Indian-bred horses, for requirements of the State and public, will be obtained, and thereby the money spent in the purchasing of horse stock will be retained in the country, and not, as now chiefly obtains, taken by importers to Australia and the Persian Gulf districts.

35. A reference to the Annual Administration Reports of the Department of Horse-breeding Operations and those on horse fairs and shows, during the last ten years, will allow of the opinion being arrived at, that the breed of country horses under the present *regimé* is steadily improving. Remount purchasing officers of Bengal and Punjab Cavalry generally admit that horses of an improved stamp are now being obtained, and the Government Remount Agents have recorded their opinion that the improvement in breed of horses found at fairs and shows in the North-Western Provinces and Punjab is marked.

36. It is thus shown that the stamp of horses in India has much improved, and it may be expected that, if the Government steadily continue fostering and encouraging horse and mule-breeding, in time all horses required by the State and public will be obtainable in the local markets.

37. When Moorcroft wrote his report, about 1810, to the Hon'ble Company, he recorded how desirous he was to find countries containing indigenous horses and horsemen, so that he might remove Stud operations from Lower Bengal, to place them in a more suitable climate, and to have horsemen to work them. We, nowadays, have at our disposal many breeds of indigenous horse stock, on which improvement is being effected.

The following list gives the several breeds now recognised :—

Mahratta.	Punjab.
Deccani and Bhimtari.	Dhunni.
Kathiawar.	Hazara.
Marwar.	Sind.
Bikanir.	Cutch.
Meywar.	Biluchistan.

Burmah (ponies).

All possessing good powers of endurance, and showing thereby *blood*, but generally wanting in size, and many too small for the work of the Indian army, constituted as it now is ; still some of pure local breeds can be found fit for Native Cavalry.

38. In history we read of the hordes of Mahratta Cavalry, but we must think of them as very small and light men on active galloways and ponies. Again, we know that, in the Punjab, under Sikh rule, Runjit Singh's Cavalry were mounted on good horses, more especially the Khalsa Horse. Thus we have now at our disposal good fields for horse-breeding, in suitable climates, and populated with natives, horsemen, and lovers of the horse, and who readily follow horse-breeding as an agricultural occupation ; and they are generally delighted to have the services of the Government stallions for their mares, and thus, as an agricultural industry, the breeding of horse stock is spreading.

39. In the course of 11 years we find that the Native Cavalry are now as well mounted on district-bred and reared horses as the British Cavalry were some 15 or 20 years ago when mounted from the Stud Department. Again, the country-bred horses obtained for British Cavalry and Artillery have been reported on favorably ; and those purchased at the early age of 18 months to two years, and reared on the Babugarh Depôt Farm, are found to be in size, weight and limb equal to the ordinary Australian remount.

40. Time is required to produce any great change in horse stock, and this will be acknowledged when we remember that the period of gestation in mares is 11 months and that the young stock do not become adult until five years of age. Eleven years only have elapsed since the inaugurating of the present Department of Horse-breeding, and it must be allowed that the results obtained, as above indicated, are satisfactory.

41. By Government steadily supporting the horse and mule-breeding industries on the sound lines laid down in 1876, doubtless, in time, all horses required by the army will be found available in India.

42. It is said that native breeders and dealers cannot, and will not, give liberty to their young stock ; and it must be admitted that, as a rule, sufficient liberty is not given ; but it is pleasing to find that the old practice of very tight hobbling and tethering, which was common and in some horse-stealing districts necessary, even to the extent of padlocking the fore feet together, is on the wane, as can be noticed by the comparative absence of fore and hind rope marks on the young stock. Again, some of the richer breeders have provided runs for their young stock ; some of these paddocks are of small size, still these facts prove that the breeders are becoming aware that tethering and hobbling prevent due development of the young horse, and reduce his value in the market.

43. Some of the officers I have the pleasure of addressing may remember the stamp of horse usually found in the ranks of the old Irregular Cavalry. They were certainly good representatives of the results of maltreatment in rearing : deformed legs and narrow chests were common. In the ranks of the Native Cavalry of the present day very superior horses are found, and these have been bred and reared by the native breeders and dealers. Surely it must be allowed that both classes are gradually becoming cognisant of the necessity of not hobbling and heel-roping to the extent of producing malformed limbs.

44. It is true that but few remounts for the British Cavalry and Artillery have been purchased in the local markets and that the Army Remount Department is chiefly dependent upon Australian and Persian importations, but many of the horses bought for Native Cavalry are quite fit for British Cavalry ; therefore it must be admitted that the number reported as obtained for the European branches of the service represents that secured, not that really available.

45. It may be hoped that a larger number of country-bred horses will be purchased by the Army Remount Department in order that the higher prices given may act as encouragement to breeders. Many breeders have expressed themselves disappointed at their young horses not having been purchased by Army Remount Agents.

46. Of late years there has been a tendency to raise the standard of height in the Bengal and Punjab Cavalry. Assuredly the smaller horses, from 14-1 to 14-3, are the best for tropical work, and these can be found in greater number than the taller horses. The latter lose in substance of leg, and size of barrel, and powers of endurance, in proportion to the increase of their height. They do not prove so hardy on field service as the smaller. The war horse should be of that build, size and breed that he will continue at work and carry his rider at a charge at the end of a forced march when being fed on short commons. The smaller horses will do all this ; the taller will not.

47. Recently proposals have been made for Native Cavalry regiments to have extensive runs for the breeding and rearing of horses. Those advocating such measures cannot have had practical experience with regard to the subject. Horse-breeding is a lottery. Horse-rearing is a business that requires practical knowledge. Many breeders in India

are ready to sell their foals, from 6 to 12 months of age, at a remunerative but small price, because they know they cannot tell how the colt or filly will prove. The purchaser has to run the risk of the youngster becoming affected with infantile diseases, and perhaps permanently weakened thereby; so would the chances of breeding and rearing have to be experienced on the runs proposed. When many young horses are collected together one of the diseases they are subject to, *viz.*, strangles, is liable to assume a severe and malignant type and cause heavy mortality. Indeed, the losses that may be expected to entail from mortality, casualties and animals proving unfit would cause the cost of those issued to regiments to become so high as to prove the experiment a failure. Horse-breeding and rearing, as an industry by itself, will never pay unless on good pasturage lands held at a very low rentage. In countries where such lands are not available horse-breeding and rearing must be associated with other agricultural pursuits, so that the dams may, when breeding, do good work, whereby profit in other ways may be reaped on the farm.

48. Estimates may be prepared to show how remunerative horse-breeding and rearing in India can be made by describing lines pleasing to the unpractical reader, but unless measures, as above noted, can be employed with respect to the obtaining of good pasture lands at a nominal rentage, and the working of the dam stock at co-operative farming industries, failure must result.

49. It has been declared that remounts for Native Cavalry are not obtainable at suitable ages and sanctioned rates. A reply to this statement can be given by the following returns of Native Cavalry remounts purchased during the last three years :—

Years.	Corps.	Yearlings.	2 years.	3 years.	4 years.	5 years.	6 years and over.	Total.
1884-85 ...	Native Cavalry...	...	24	396	430	200	126	1,176
,, ...	Remount Department ...	...	69	47	9	3	2	130
,, ...	Police ...	...	...	18	32	7	8	65
1885-86 ...	Native Cavalry	1	133	1,085	935	553	532	3,239
,, ...	Remount Department ...	43	48	21	3	...	2	117
,, ...	Police ...	...	2	18	16	9	9	54
1886-87 ...	Native Cavalry	...	40	125	80	44	39	*328
,, ...	Remount Department ...	Returns not yet received.						
,, ...	Police ...	Returns not yet received.						

It will, therefore, be observed that the horses required have been obtained and that an extraordinary demand was made for Native Cavalry

* This number was purchased by nine regiments of Native Cavalry. The returns of the remaining regiments have not yet been received.

remounts during 1885-86. It might have been expected that in the year following the extra demand upon the market the supply would not be sufficient; still the Native Cavalry Purchasing Committee in the North-Western Provinces obtained in 1886-87 the complement required. The Purchasing Committee for Native Cavalry remounts in the Punjab were not successful, but the causes in operation are being enquired into: it is believed that the horses wanted will yet be obtained.

50. Instead of Government listening to the recommendations for horse runs for the Native Cavalry, it will be a wiser and safer plan to offer better prices for the stock required. The sanctioned price of Rs. 200 was doubtless ample for the old class of Irregular Cavalry remounts kept, but the Native Cavalry of the present day are no longer irregular, and are mounted on superior horses, for which they have to pay a superior price. Again, irrespective of the improvement in breed, doubtless, price of horse stock has, during the last few years, risen in the market, so it may be hoped that Government will take the subject of raising the sanctioned price into consideration.

51. It was the fact of higher prices being paid for Native Cavalry remounts that caused the Government of India to institute the purchasing by Committees for the Bengal and Punjab Corps so as to prevent regiments competing with each other at fairs and shows, and thus, as it was thought, keeping up the price. Doubtless many horses that would have been purchased under the old regimental purchasing system have been refused by Committees, and in the aggregate a better lot of remounts has been secured; but the prices have been, more or less, maintained.

52. By a recent ruling of the Government of India His Excellency the Commander-in-Chief was requested to appoint an officer on the Purchasing Committees to buy any horses suitable for British Cavalry and Artillery. But unfortunately an officer was not appointed, and thus, I feel assured, remounts fit for British Cavalry and Artillery were not secured. Much good would be derived by having an officer of British Cavalry or Artillery on the Committee, as breeders and dealers in possession of superior stock would then be glad to bring their animals forward with the hope of obtaining proper prices for them, whereas such owners avoid the Committee as they know they will not get the value of their stock.

53. The Native Cavalry of India have gained a world-wide fame; they have proved themselves equal to numerous campaigns; they have been made use of as the Uhlans of the columns to which they are attached; and they have done right good service in battle. The names of the engagements emblazoned on their regimental colors and the medals on the breasts of their soldiers have been earned by the good work their horses have allowed them to perform. Truly it can be declared that the Indian Native Cavalry are fit for service in any part of the world and in all extremes of climate; this cannot be said of the Cavalry of any other State or country. It can be

also safely averred that the cost of their horses is less than that of any other Cavalry, and this may still be said even when the sanctioned price becomes enhanced.

54. The Government have wisely adopted measures to improve the horse stock of India and cause the mounted branches of the Indian army to be well horsed. Surely it is in the interests of Government to allow the Native Cavalry to be mounted on the superior horses now obtainable in the market. These improved horses are worth a higher price, and, in obedience to the law of demand and supply, unless a superior price is paid for a superior article, the latter will no longer be found in the market. It cannot be too strongly urged, as laid down for guidance in the Right Hon'ble the Secretary of State's Despatch above quoted, that to foster and encourage horse-breeding in India remunerative prices must be paid for army remounts.

55. It has to be noted that castration of colts is becoming more popular; thus the young horses have not to be so tightly hobbled and tethered, and are, at times, let loose with the filly stock. Salutris and Castrators, under the Horse-breeding Department, are distributed in breeding districts, and owners can have their colts castrated gratis. At first objections were raised to castrating, but as owners find the geldings are so easily managed and reared, and that they realise as good, if not better, prices in the market, the services of the Salutris are becoming more in demand. In the year 1885-86 the number of colts castrated by the Salutris of the Department was 1,138 in the North-Western Provinces and Punjab, and 122 in the Bombay Presidency.

56. It may be safely asserted that, provided Government will steadily continue to foster and encourage horse-breeding on the sound lines laid down, *viz.*, (*a*) the granting of a due supply of stallions, and (*b*) directing that all country-bred horses, fit for the several branches, be bought, and thus the buying of imported stock may become gradually reduced, so that the money spent by the State in horse purchasing may go into the pockets of the Indian horse-breeders, it will be surely found that India will, in due time, provide all horses required by the State and public, and of a stamp possessed of size, power and enduring qualities.

57. The soil and climate able to produce the wonderful polo ponies of India will certainly yield as good horses, provided breeders and rearers of horse stock find the industry remunerative.

58. The fact of horse stock not being used for agricultural work in India is a loss to the horse-breeding industry; but the employment of a very useful stamp of galloway and pony in ekkas in Northern India does promote the breeding of a valuable class of animals for mounted infantry and transport work. Mares have been, for the last five or six years, employed for farm work at the depôt, Babugarh, to show native farmers that mares can perform agricultural work and are more remunerative than bullocks, as the latter do not yield produce, but the former do, as horse or mule-breeders.

59. Horse-breeding, in this paper, has been considered mainly with regard to State requirements; and as the Government are most desirous to have a home supply of horse stock, they must not only say they are prepared to foster and encourage the industry but they must take care that the fostering and encouraging is practically carried out by the purchasing, at remunerative prices, of every head of country-bred stock fit for one or other branch of the service; and in this way pecuniarily give encouragement. The same action should be adopted as regards the buying of mules.

60. An ample supply of both horses and mules will, in time, be available in India if the demand, based upon the lines indicated, be steadily made. Indian-bred horses and mules will prove better and less expensive for Indian service than imported stock.

61. The cost of the Horse-breeding Department in India may be truly said to be most inexpensive compared to the amounts required on the Continent of Europe by the States below shown, extracted from Reports of Her Majesty's Diplomatic Agents at Paris, Vienna and Berlin :—

France	...	...	...	£ 269,720 per annum.
Austria	...	...	...	£ 140,000 per annum.
Germany	...	...	...	£ 80,000 per annum.

Budget Estimate for 1887-88 of the Department of Horse-breeding Operations in Bengal is Rs. 2,08,760, or, in sterling, about £16,000. In the Bombay Presidency, during 1885-86, the expenditure amounted to Rs. 57,000, or, in sterling, a little over £4,000. With the growth of horse and mule-breeding there must be a proportionate increase in stallion power.

General Chapman opened the discussion on the above lecture with the following remarks :—

Mr. Hallen is hopeful that, in the course of a few years, a sufficiency of Indian-bred horses for the requirements of the State and the public will be obtained, and thereby the money spent in purchasing stock will be retained in this country and not, as now, taken by importers to Australia and the Persian Gulf districts. I cannot say that I am as sanguine as Mr. Hallen is in this respect. The increasing demand for horses in India is, in my opinion, likely to outstrip the development of our breeding operations unless they are expanded far beyond the limit authorised in the recommendations that are now before the Government. The increasing wealth of the native population and their advance in the appreciation of luxuries is apparent in every one of our native cities. The demand for horses is everywhere steadily increasing, and the amount of young stock drafted from our breeding grounds to Native States is considerable. The establishment of Stud farms under Government supervision was rightly abandoned as being a method of obtaining horses which was too expensive and also tending to check native enterprise in the matter of horse-breeding which it is so desirable to encourage. But I hardly think we realise sufficiently the rapid strides which India has been

making during the last 20 years. However forward the policy of the Government may be in regard to railway extension and other public works it cannot, in my opinion, keep pace with the requirements of the rapidly increasing demands of British India. There is a tendency to rest satisfied because we are doing a great deal more than was done 20 years ago, but 20 years ago existing circumstances in the life of the native population were never dreamt of, and in all departments of the State the fear is that rigid financial restrictions and the annual balance of the Budget must prevent us from doing enough. In regard to horse-breeding operations I myself think there is room for the encouragement of small Stud farms as well as for the extension of the zemindar system. Mr. Hallen has given it as his opinion that Native Cavalry cannot afford to undertake the rearing of horses, and that, as an industry standing alone, horse-breeding and horse-rearing can never pay except on good pasturage lands held at a very low rental; that, in fact, horse-breeding and rearing must be associated with other agricultural pursuits. I am sorry that there is no officer here representing the 11th Bengal Lancers to tell us something regarding the operations at Probynabad. I think the regiment attach great value to the farm, and I hope I am right in saying that they regard it as a profitable speculation. The best of their young four-year-olds will fetch something like Rs. 500 in the open market, and by the sale of a certain number they can reduce the cost of the remainder. I thing we need to extend the farm system, and I should be glad to hear of other Cavalry regiments having such farms as that of Probynabad. Why should not horse-breeding in such farms be associated with other agricultural pursuits? I am sorry to differ from the lecturer in regard to this point. I cannot think it has anything to do with the question of increasing the price given for Cavalry remounts. The price must be increased as the market value of horses rises.

What I really want to point out is that the official mind grasps with difficulty the extraordinary number of horses and mules that must be needed for war purposes during the course of the next few years if we are to enter upon the struggle which most of us anticipate, and that in this matter of horse-breeding and mule-breeding it is not sufficient for Government to stand alone in making efforts to obtain a more certain supply of the animals, upon which our success in war must depend. Every individual officer, whether he be in the command of a Cavalry regiment or in a humbler sphere, with other branches of the service, is directly interested in promoting the extension of horse and mule-breeding in India. No civilian at the head of a district, or working in a subordinate position, can fail to see the advantage of this important industry. It is not sufficient to leave the question entirely to the Government to be dealt with by a Department. Each of us, soldiers and civilians, can do something to advance the matter. As a first step to so doing we need to know more of the subject than most of us can profess to do, and we have to be specially grateful to Mr. Hallen for having put forward the information his lecture contains. I hope

that it may be read and thought over by a large number of officers in the army, and that the discussion of some of the points which he has raised may be of value to the Government for further consideration of the question of horse and mule-breeding.

Colonel Lance said: I have been asked to take part in this discussion on very short notice, and as there are many points that have been raised by Mr. Hallen, which I have no doubt could be more ably discussed by others than myself, I propose to confine my remarks to the results of the Horse-breeding Department with reference to the Native Cavalry. I remember some twelve years ago Sir Frederick Haines asking me on parade whether we got remounts easily, and I replied that there was great difficulty and the quality was inferior. Our present Commander-in-Chief remarked to me that he had very often heard that answer given before, but during all the years he had seen Native Cavalry regiments every year they were better mounted than the year before. If that was true some time ago it is much more true now, and for that we may thank the Horse-breeding Department. I have heard it argued that Native Cavalry need not be mounted as well as they are, and that the work done by the Irregular Cavalry in former days, when mounted on such horses as Mr. Hallen has described to us, was as good as would be required of them now. I think the memory of these *laudatores tempora acti* must have been rather deficient, or perhaps in their young days they took a different view from what they did later in life. That we have increased in efficiency must be acknowledged, but we must be very much more efficient before we are satisfied with ourselves; and that we may become so we must look to Mr. Hallen and his Department to assist us. The Horse-breeding Operations Department is only 11 years old, and it was born among very bitter controversies and strifes, and whatever are the merits or demerits of the present system it must be allowed that it has put within our reach a much better class of horses than was procurable before under any other system. It now behoves officers of Cavalry to influence those who have the power of the purse strings to give more money to assist Mr. Hallen in the operations of his Department. Mr. Hallen has not told us entirely the system upon which he has been acting, but the general system I think has been to select a few districts considered favorable for horse-breeding operations, for the good quality of the native breed, or other considerations, and encouraging breeders there by visits from officers of the Department, by spending large sums of money in offering prizes, and, more than all, by supplying to the full requirements of these districts the very excellent and costly stallions the Department has at its disposal. The Dera Ghazi Khan district is one of the districts that I have described. Twenty years ago a native fair was held at Pir Adil near Dera Ghazi Khan, at which the Cavalry regiment stationed there thought itself fortunate if it got three or four remounts. The fair now is considered one of the best for getting remounts, and supplies as good horses for Cavalry as any place in India. I was myself the President of

the Judging Committee, for four consecutive years, for giving awards, and it was interesting to mark each year the improvement in the stock presented for prizes. Of course this is entirely due to the efforts of the Horse-breeding Department; but, while there are a few such districts in the Punjab, still there are others which are in utter darkness, and I think the great thing now is to try and induce the Department to extend its operations to these districts. The Bannu district is one of those to which I refer. For many years there were three or four stallions kept up there under the old system by the Government, the services of which were given gratis, and they gradually drove out the indigenous stallions. Within the last few years, however, these Government stallions have died out and have not been replaced, and the people fairly complain of what they consider almost a breach of faith on the part of the Government because now they say they have nothing but ponies or inferior country-bred horses to breed from. It behoves every officer interested in Native Cavalry to help Mr. Hallen to get more money to introduce his operations into these districts. Though he could not possibly supply these districts with the excellent stallions that have been supplied to the more favored districts that I first described, yet I believe sufficiently good stallions could be procured from districts like Dera Ghazi Khan that would be of great service. At any rate they would be very much better than anything the people have now. I think I have shown that the extension of the Department is necessary, and that it is still in its infancy and requires more support and careful nursing; especially it requires more nurseries and also possibly more nurses.

Colonel Ben Williams said: Gentlemen,—I have been asked without any warning to get up and talk on the subject of horse-breeding and rearing. I am sorry to say I must differ from Mr. Hallen on one or two points with regard to the necessity of having rearing depôts. I think the officers of the Bengal and Punjab Cavalry regiments here will agree with what Colonel Lance has just said as to the superiority of the country-bred horse, that he has increased in numbers, and is of a better description, and has arrived now almost at perfection for the Native Cavalry. But there is one point on which I must disagree with the remarks you have heard, and that is with regard to the rearing of horses. I am of opinion that, to obtain good horses for the Department which I am in charge of, it is absolutely necessary to rear the horses ourselves and not leave them to native breeders. When they rear them they stall-feed them and fatten them up in such a way that when they are three or four years old their form is marred and their action spoiled. They have not the means of rearing them in the way Government can. Their great idea is to get rid of a horse in its youth. Dealers and other people are always after them trying to buy their produce and offer them large prices, often larger than we can afford to give. I suppose two-thirds of the horses brought to fairs are under four years of age. These are sold quickly enough, and the older ones always show

signs of deterioration; first of all, by unsoundness, and, secondly, by crooked legs. Want of action is one of the greatest faults. This is brought about by their being tied up and fed until they are made over to the dealers. Dealers are everywhere over the country. They hover about every fair, and offer prices for young stock, and buy them as yearlings or eight months old. They were carried away to Native States and sold in the great towns. They were taken away where we could not get them. Formerly it was the order of Government that one hundred young stock were to be purchased every year, and these were got readily enough. Full-grown remounts were difficult to obtain because they were not procurable at fairs. This year he had induced the Government to give him leave to purchase 200 young stock. During the last year we had been able to purchase in the open market only 126 full-grown remounts. This year the number was very small again. During the last six months they had been able to send into the services from the depôt 101 remounts. As Mr. Hallen has remarked the animals bred by his Department compare very favorably with walers. I think every credit should be given to the Department for Horse-breeding Operations. Mr. Hallen and those under him are now breeding and producing better horses than we have ever had before in India.

Major T. Deane said: General Chapman and Gentlemen,—I did not come here prepared to make any remarks on the Horse-breeding Department, which has been so interestingly referred to by Mr. Hallen, Colonel Lance and Colonel Williams. I think, however, it would be well to make a few remarks on the policy of Government in the matter in so far as the British mounted branch of the service is concerned. Government is, I believe, desirous of helping Mr. Hallen's Department to the utmost. The number of stallions in the Department now is about 314. I quite agree with what General Chapman has said, that the growth of wealth and prosperity in India has necessitated, or should necessitate, the increase of the Department for Horse-breeding Operations in the purchase of more stallions. Mr. Hallen has told you what the money spent upon the Continent is. In India very little indeed is spent. India is a poor country, and money is not always forthcoming. We can only hope that when it is forthcoming, sooner or later, one of the first directions in which more funds will be made available will be in the Department for Horse-breeding Operations. With regard to the way in which Government try to secure country-bred horses for the British branches of the army, I would say that the order, as it stands in a notification which is published in all the newspapers in India, is that as many full-grown country-bred horses as are procurable should be purchased, and now 200 young stock per annum. There has been a good deal of discussion as to whether Government should purchase country-bred horses young or old. On the one hand we hear that full-grown country-bred horses, that is to say, remounts of four years old, are not obtainable. On the other hand we hear that

plenty are obtainable and are not bought. The action of Government in the matter is clearly to cover both parts of the question. That is to say, if full-grown country-bred horses are obtainable, they ought to be bought. If not, then, as an experimental measure, Government has sanctioned the purchase of 200 young stock. I have seen these young horses, and the result of running about for hours on the Government farm, and being fed on the farm produce, is most satisfactory. Most of these horses are probably from one to two years old, and at 4½ years old they are drafted into the ranks of the Government service. The horses reared under these conditions are in many respects not inferior to walers. It was only the other day that I was favored by General Greaves with an opportunity of seeing the horses of the 8th Hussars. They are mounted almost exclusively on Persian and country-bred horses. In going round the ranks of the horses the thing that attracted notice was the magnificent shape and conformation of the country-bred horses, and on enquiring where they came from I was told that they had recently been drafted from the depôt. I have seen also reports from officers in the Bombay Presidency to whom these country-bred horses have been drafted. In one case the opinion of an officer was that they were in no way inferior to walers of the present day. No greater praise could be given to the Department than that because it is generally admitted that Cavalry mounted on waler horses are the best mounted in the world. When the country-bred is compared to the waler we may be sure the country-bred is making considerable progress.

Mr. Oliphant, Inspecting Veterinary Surgeon, said: Having had an opportunity for many years of inspecting the Cavalry remounts in Bengal and the Punjab and the British services, I can say that a great improvement has taken place in the last few years. With regard to the question of runs, I agree with Mr. Hallen that horse-breeding will not pay; but with regard to runs I disagree with him. I do not think the native, for many years to come, will bring up young stock in the way it ought to be brought up. Liberty he will not give it, and it even gets insufficient food. I think Mr. Hallen has rather overstated the risk that follows from disease. Under the old arrangements sickness was rife, and the results of strangles were frightful; but with fresh air and better food the risk is not so great. In talking of runs some people think they have nothing to do but to turn stock loose to pick up their living. I have never in India seen a place where horses could pick up a living as they do in Australia. Food must always be provided, and, therefore, a run can never be kept without some expense. Breeding, therefore, must be left to natives, but whether they will rear their stock properly I very much doubt.

Colonel Lance, apologising for speaking a second time, referred to the Stud farm of the 11th Bengal Lancers mentioned by General Chapman. The farm, he said, was started under most favorable conditions, the troops having just returned from China with a fund of

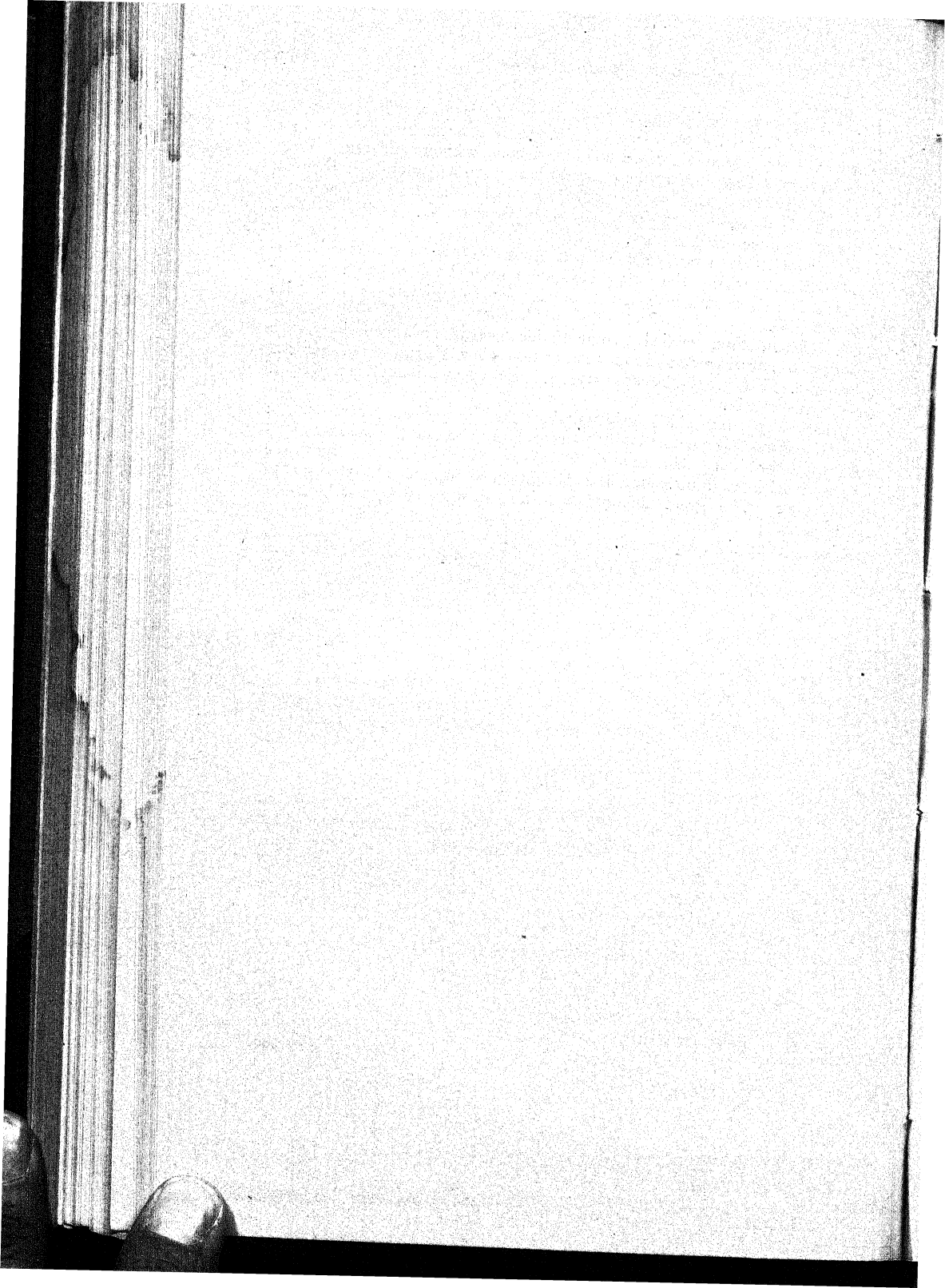
Rs. 40,000, which had been deducted from their pay. The losses in horses had also all been made good. Under ordinary circumstances Native Cavalry regiments could not rear horses without assistance from Government. The Government would have to give ground and make advances for ten years to be paid back in another ten. In this way it could be done, but if the money were given to Mr. Hallen perhaps he could produce better results.

General Chapman said that he was aware of the favorable circumstances under which the Bengal Lancers started their farm ; still he thought if the Government could make advances to regiments good results would follow.

Mr. Hallen then replied to some of the remarks made, especially with reference to carrying Stud farms too far lest they should check private enterprise. Natives had capability enough to rear horses properly if they found it paid.

General Chapman said it only remained for him to thank Mr. Hallen for his interesting lecture and congratulate him on the evident sympathy felt for him. He thought horse-breeding operations might be extended without limit, and the Government would always get its money back. The great mistake was in hesitating to "put the money on."

The meeting then separated.



THE AUSTRO-HUNGARIAN ARMY.

Translated from the French of Lieut.-Col. A. Dalby, Commanding 98th Regiment, Territorial Infantry.

By Major E. R. Elles, R.A., A.-Q.-M.-G.

General Organisation.

The total of the military forces of the Austro-Hungarian Empire include, in addition to the standing army, the Cis-Lithuanian "Landwehr," furnished by the countries represented in the Reichsrath and Hungarian or Honvel "Landwehr." The three parts of the national forces are administered by three different ministers, *viz.* :—

The Minister for War.
The Minister of Cis-Leithan National Defence.
The Minister for Hungarian National Defence.

They are, too, maintained on three different budgets, voted respectively by the delegates, by the Reichsrath of Vienna and by the Reichstag of Keith.

This complexity of military organisation is a reflex of the complexity of the political institutions of the Empire. The whole of these forces have the Emperor for Commander-in-Chief. The army is formed in fifteen army corps, and in addition there is the military command at Zara in Dalmatia. The army corps are extended to form three armies, one of which has five and the other two four army corps each.

Each army corps has two divisions of the active army and one division of Cis-Leithan or Hungarian Landwehr. The army corps is commanded by a "Feldzengmeister" or a General of Cavalry.

The two army corps not employed in the formation of armies are the 14th, specially entrusted with the defence of the Tyrol, and organised for mountain warfare; it is formed of one division of the active army and one division of "Landesschützen." The 15th corps and the troops of the Zara military command have for their mission the guarding of Bosnia, Herzegovina and Dalmatia.

The troops remaining available after the mobilisation of the 15th army corps and of the Zara military command are employed in garrison duty and the defence of fortified places.

The organisation of the army is based on 36 infantry divisions; but in time of peace the 20th, 21st, 22nd, 23rd and 26th do not exist, and are not formed until the time of mobilisation from the Cis-Leithan or Hungarian Landwehr. Twelve new divisions should be further formed in case of general mobilisation, namely, two from the troops of the active army, six from the Hungarian and five from the Cis-Leithan Landwehr, and one with the Landesschützen of the Tyrol and the Vorralberg. This brings the number of infantry divisions up to 48.

The infantry divisions are commanded by a Lieutenant Field Marshal.

The cavalry are formed in brigades of two regiments, attached to army corps, and in five independent cavalry divisions, one of which is of Hungarian Landwehr. These divisions have two brigades.

Consequently on mobilisation the sum total of the Austro-Hungarian army consists of 48 infantry divisions, 39 of which form the first 13 corps constituting the three armies, 5 are specially attached to the 14th and 5th army corps, and 4 remain available for occupying garrisons and fortified places.

According to the then composition brigades are called infantry, cavalry or mountain brigades, and are commanded by a Major-General.

The army has 62 brigades of infantry (on peace footing), 21 brigades of cavalry, two of which are only formed on mobilisation, six mountain brigades and one garrison brigade.

Brigades of infantry should normally consist of seven battalions, but many have more or less; all cavalry brigades have two regiments except three, which have three. Mountain brigades generally have four battalions of infantry and a battery of mountain artillery.

The artillery regiments are not brigade. From a recruiting point of view the Austro-Hungarian Empire is divided into 106 recruiting circles, 103 being for the land forces and 3 for the navy. Each army recruiting circle is attached to an infantry regiment and to the Tyrolian Rifles. With regard to the other arms their quota of recruits is furnished by one or several recruiting circles detailed for the purpose.

This method of recruiting produces the following results :—

	Cis-Leithan.	Hungary.	Total.
Regiments of Infantry ...	... 55	47	102
Battalions of Rifles ...	... 32	8	40
Cavalry { Dragoons ...	... 14	0	
Cavalry { Hussars ...	... 0	16	41
Cavalry { Uhlans ...	... 9	2	
Regiments, Field Artillery	... 7	6	13
Battalions, Garrison Artillery	... 9	3	12
Ditto of Engineers	... 8	2	10
Ditto of Pioneers ...	... 3	2	5
Divisions of Train ...	... 7	8	15

Troops for the sanitary, clothing and supply services, &c., are furnished from the whole Empire.

Regimental Organisation.

Infantry.

The Austro-Hungarian Infantry consists of—

102 Regiments of Infantry.
1 Regiment of Tyrolian Rifles.
40 Regiments of Rifles.

The Regiment of Tyrolian Rifles consist of—

1 Regimental Staff.
12 Battalion Staffs (2 of Depôt).
40 Companies forming 10 Service Battalions.
10 Companies forming 2 Depôt Battalions, giving an effective total of—

270 Officers.
12,057 Men.
350 Horses.
160 Vehicles.

The Service Company is composed as under :—

Officers	4	
Under-Officers	7	
Corporals and Lance-Corporals	34	
Buglers	4	236
Riflemen	180	
Pioneers	4	
Drivers	3	
Officers' Bâtmen	4	

Each service battalion of the rifles of the line has a strength of—

26 Officers.
1,203 Men.
34 Horses.
16 Vehicles.

Consequently the whole corps of rifles gives—

1,310 Officers.
60,177 Men.
1,710 Horses.
800 Vehicles.

The regiment of infantry consist of four battalions of four companies each, numbered from 1 to 16, and in addition a depôt battalion of four companies.

On a war footing the company of infantry consists of—

Officers	4	
Under-Officers	7	
Corporals and Lance-Corporals	30	
Privates	180	
Drummers and Buglers	4	232
Pioneers	4	
Drivers	3	
Officers' Bâtmen	4	

With its staff the battalion has a strength of 20 officers, 935 men.

The strength of the regiment is—

	Officers.	Men.	Horses. Riding.	Horses. Draught.	Vehicles.
Staff	4	81	14		
4 Service Battalions ...	80	3,740	32		
Depôt Battalions ...	21	911	3		
Staff Sections		30			
Trains		48		80	34
Total ...	105	4,810	49	80	34

The four staff sections maintained by the four regiments of the same division are intended to be united with one staff company, bearing the number of the division.

The infantry then furnish a form of strength as under :—

		Officers.	Men.
Service Troops ...	102 Regiments ...	8,568	394,536
	102 Staff Sections ...	...	3,060
	10 Tyrolian Battalions ...	226	9,827
	40 Rifle Battalions ...	880	40,824
	Total ...	9,674	448,247
Depôt Troops ...	102 Infantry Battalions ...	2,142	93.024
	2 Tyrolian Battalions ...	44	2,230
	40 Rifle Companies ...	160	7,296
	Total ...	2,346	102,550

The two national armies, the Cis-Leithan and Hungarian Landwehr, have to furnish the divisions intended to take their place in the field army side by side with the divisions of the active army, as will be seen further on.

Cavalry.

The Austro-Hungarian cavalry consists of 41 regiments, *viz.* :—

14 Regiments of Dragoons.
16 „ Hussars.
11 „ Uhlans.

Each regiment on a peace footing comprises —

1 Staff of Regiment.
2 Staffs of Divisions (of 3 squadrons each).
6 Service Squadrons.
1 Depôt Cadre intended in case of mobilisation to form—
(*a.*) 1 Reserve Squadron.
(*b.*) 1 Depôt Squadron.
(*c.*) 2 Escort Sections.

These 41 regiments are allotted to 20 brigades of two regiments each except the Vienna brigade, which has three.

In each regiment there is a pioneer section, which receives special technical instruction. In addition five men per squadron have pioneer tools, one pick, two shovels, one axe and one hatchet.

The equipment and harness are uniform in all cavalry regiments.

The cavalry (except orderlies and two men of the pioneer section, who lead pack horses, who have the pioneer sabre) is armed with the cavalry sabre and the Werndl Carbine. Drivers and men of the escort section have no carbine.

The officers and under-officers are armed with the revolver, as are also the men of the escort section and the dismounted men of the pioneer section.

The carbines are supplied with 50 rounds and the revolvers with 30.

The service squadrons of cavalry regiments serve to form independent cavalry divisions and brigades attached to army corps.

The reserve squadrons are employed either with the army corps, or on the lines of communication or in garrisons.

The escort cavalry is intended for use with head-quarters and with the supply departments.

The staff of a cavalry regiment consists of—

Officers ...	7
Men ...	74
Horses ...	102

amongst whom are included the pioneer section.

The staff of a division (3 squadrons) of a regiment consists of—

Officers ...	2
Men ...	3
Horses ...	6

Each squadron on a war strength has—

Officers ...	5
Men ...	166
Horses ...	161

A reserve squadron has—

Officers ...	6
Men ...	171
Horses ...	169

The depôt squadron has the same strength as the service squadron, but in addition 1 paymaster lieutenant, 1 surgeon, 1 veterinary surgeon, 1 clerk and 2 orderlies.

The two escort sections furnished by each cavalry regiment each comprise—

Officer ...	1
Men ...	43
Horses ...	42

Cavalry regiments have also to furnish a certain number of field police, fixed at 1 subaltern and 12 under-officers.

The train of a regiment consists of—

32 Vehicles.
80 Horses.

The total strength of the 41 cavalry regiments is—

Officers	2,337
Men	61,582
Horses	61,295
Vehicles	1,312
Draught Horses	3,280

Artillery.

The artillery consists of—

Field artillery.
Fortress artillery.
Technical artillery, specially attached to the artillery establishments.

The field artillery consists of 13 regiments; 5 regiments consist of—

2 Horse Artillery.
2 Light Field of 8 cm. guns.
11 Heavy Field of 9 cm. guns.
1 Depôt Battery.

Eight regiments have—

13 Heavy Field.
2 Light Field.
1 Depôt Battery.

The field batteries are of 8 guns and horse artillery of 6.

The horse artillery are grounded in two batteries, and form the artillery of the independent cavalry divisions.

The field batteries, heavy and light, are formed into divisions of two batteries, and are distributed to the army corps and infantry divisions.*

The fortress artillery consists of 72 companies, formed in 12 battalions of 6 companies each, which furnish 22 mountain batteries of 4 guns each.

It is believed that this artillery, furnishing 1,644 field guns and 88 mountain guns, has lately been reorganised, and that the 13 regiments now form 14 brigades, one of which is attached to each of the first 14 army corps. The 15th corps continues to have only mountain batteries.

Each of these 14 brigades is to be formed as under—

1st.—One regiment of corps artillery,	1 Division of 3 Heavy Batteries. 1 Division of 2 Light Batteries. 1 Ammunition Column Cadre. 1 Depôt Cadre.
2nd.—Two divisions of divisional artillery, each	1 Division of 3 Heavy Batteries. 1 Depôt and Ammunition Column Cadre.

In addition there are to be—

1*st.*—8 divisions of 2 horse artillery batteries, each intended for the cavalry divisions.

2*nd.*—9 divisions of 3 heavy batteries, 1 depôt and ammunition column cadre, each intended for the Landwehr infantry divisions.

This total will give—

154 Field Batteries.
29 Field Batteries for Landwehr.
16 Horse Artillery Batteries.
51 Depôt Cadres.

Technical Troops.

Railway and telegraphs, engineers, pioneers.

The railway and telegraph regiment is intended to secure the railway and telegraph services in the field.

In peace time the regiment consists of a staff, 2 battalions of four companies each and a depôt cadre.

In time of war these units are expanded to form—

8 Railway Companies.
3 Field Telegraph Staff (Direction) of 1st line.
3 Field Telegraph Staff (Direction) of 2nd line.
43 Field Telegraph Sections and 3 Mountain Telegraph Sections.
1 Depôt Battalion of 2 companies.

The total of these formations gives—

Officers	117
Men	4,652
Horses	347

The railway companies and telegraph sections are provided with a supply of tools, apparatus and diverse articles, which form their field equipment; the telegraph sections also have line material. All equipment is carried on special vehicles, and that of the mountain section is prepared for pack carriage at any moment.

The direction of the military railway service is given to a staff officer of superior rank, who communicates with the Commander-in-Chief of the army through the chief of the staff.

The telegraph service is placed under the direction of a Director of Telegraphs attached to the head-quarters of the army.

The men forming the combatant portion of these formations are armed with the Werndl rifle for special corps, the pattern of which is shorter and lighter than the ordinary rifle, with the short bayonet and pioneer's sword. All other men have only the pioneer sword. An under-officer carries 20 and men 30 cartridges.

The engineers mobilise 40 field companies, 4 reserve companies and 10 depôt companies, giving a total of—

Officers	337
Men	13,800
Horses	1,814
Vehicles	480

Each infantry division mobilised receives an engineer company.

The pioneer corps should mobilise 20 field, 5 reserve and 2 companies,

5 reserves of *matériel* and 2 mobile depôts of *matériel* and 5 depôt companies, giving a strength of—

Officers	181
Men	7,092
Horses	607
Vehicles	140

A company is attached to each army corps mobilised, and carries bridging *matériel* with the advanced guard capable of throwing a bridge of about 15 yards for crossing moderate obstacles unexpectedly encountered.

The regular bridging *matériel* always remains with the army reserves, and admits of a stream 57 yards wide being bridged. With the two bridge trains and that with the pioneers each army corps has 130 yards of bridging.

The grand total of these troops, railway and telegraph, engineers and pioneers, gives a war strength of—

Officers	635
Men	25,544
Horses	2,837
Vehicles	620

without taking into account vehicles for railways, telegraphs and bridging *matériel*.

Train.

The train or transport in time of peace consists of in time of peace of three regiments, which are so organised that in time of war they are capable of expansion into the following :—

In First Line.

1*st.*—3 staffs of regiments intended to form the supervising staffs of the army.

2*nd.*—13 staffs of divisions.

3*rd.*—15 train squadrons attached to—

1 Squadron to head-quarters of army.
3 „ „ „ of the 3 field armies.
13 „ „ „ „ 13 army corps.
42 „ „ „ „ 1 infantry division.
5 „ „ „ „ cavalry division.
11 „ allotted to the 44 bridging trains.

4*th.*—20 squadrons of mountain train.

In Second Line.

1*st.*—13 army corps parks.

2*nd.*—13 sections attached to supply depôts.

3*rd.*—13 sick horse depôts.

4*th.*—39 detachments attached to field hospitals.

5*th.*—3 army parks.

The three depôts of the regiments remain in the interior of the country. The total strength is—

	Officers.	Men.	Horses.	Vehicles.
1st Regiment ...	259	10,609	14,089	2,557
2nd „ ...	288	12,525	16,567	2,732
3rd „ ...	253	9,996	12,697	2,342

The Cis-Lithuanian Landwehr.

This Landwehr is formed in three categories—

1*st.*—Service for two years for those who have finished their ten years' service in the active army and reserve.

2*nd.*—Service for 12 years for all men fit to serve who have not been included in the contingents for the active army.

3*rd.*—All men freed from all military obligation who engage to serve voluntarily.

The commandants of the 1st, 2nd, 3rd, 8th, 9th, 10th and 11th army corps and the military commandant of Zara are the territorial commanders of Landwehr in the limits of their commands. Under them is a general officer of the army or a colonel of the permanent Landwehr cadre, with the title of assistant commandant of Landwehr to direct their training and to ensure the establishments and corps being always ready for mobilisation.

In each army corps there is a special staff for Landwehr, together with the army corps staff.

On mobilisation or during manœuvres the assistant commandant of Landwehr takes command of all the Landwehr troops mobilised in the army corps district.

On a peace footing each Landwehr battalion has a permanent cadre consisting of—

The Commandant.
Officer in charge of equipments.
Cadre of instruction.

There are 82 battalions. During peace time these battalions (except the 4 Dalmatian battalions) are grouped 3, 4 or 5 together, and form 22 regiments, which have a number and only bear the name of their recruiting province.

The 5 first regiments are Landwehr Rifles, the remaining 17 Landwehr infantry, but there is no difference in recruiting, or tactical use, only in clothing.

On mobilisation each Landwehr battalion furnishes—

1 Battalion Staff,
4 Service Companies,
1 Depôt Company,

and in addition a variable number of reserve companies according to the number of men furnished by the battalion district.

The battalion has a strength of—

22 Officers.
960 Men.

On mobilisation the Landwehr regiments are formed into brigades and divisions.

The division comprises—

The Staff.
Two Brigades Staff.
14 to 15 battalions of Infantry.
3 to 4 squadrons of Army or Landwehr Cavalry.
1 Division of 2 Batteries of the Army Auxiliary Services.

The commanders of divisions are generals of the active army, those of brigades either generals of the army or colonels of the army or Landwehr.

The reserve companies are formed into reserve Landwehr battalions, chiefly attached to garrisons.

The totals furnished by the Landwehr come to—

82 battalions, about... ...	...	82,000
Special arms ...	...	15,000
Cavalry ...	...	6,000
82 Depôt Companies	...	24,600
		1,27,600
The total contingent is about	...	1,70,000
		42,400

There consequently remain available 42,400 for the reserve battalions, forming 30 to 40 battalions for garrison service.

The Special Landwehr of the Tyrol and Vorarlber form 20 battalions of rifles (Landesschützen), of which 10 are for field service and 10 for reserve, giving a total of 19,800 men with 2 squadrons of 160 each and 400 gunners for mountain artillery.

The Landwehr cavalry consists of 6 regiments, 3 of Dragoons and 3 of Uhlans; each regiment has for service one depôt squadron.

Hungarian Landwehr.

This Landwehr also forms an integral part of the active army which it reinforces, and also guards the interior of the Empire. In time of war it cannot be employed outside Hungary without the authority of the Reichstag. In peace time it can be exceptionally employed in the maintenance or re-establishment of public order.

It is formed in three categories—

1*st.*—All young men who have not been required for the annual contingent for active army, reserve or navy. The period of service is 12¼ years, or up to the age of 32.

2*nd.*—All men who have finished the 3¼ years' army and 7 years' reserve service. They have to serve two years in Landwehr.

3*rd.*—Men who having fulfilled all the military obligations are still fit for service and engage for two years or during a war. Hungarian territory is divided into seven large Landwehr districts, at the head of each of which is placed a general officer of Landwehr, who is under the superior commander of Landwehr, with the Minister of National Defence.

Each of these districts on mobilisation forms an infantry division.

The districts are subdivided into brigades, demi-brigades, battalion cadres and company circles, and each furnishes also one or several cavalry regiments.

Each district has 2 infantry brigades of 6 or 7 battalions; each

brigade, 2 demi-brigades* of 3 or 4. The total of this Landwehr is 92 battalions, which on a peace footing have a permanent cadre of 9 officers and 48 men.

Each battalion on mobilisation leaves a depôt company to fill up the waste in the service battalion.

Cavalry of Hungarian Landwehr.

A general officer is appointed permanent inspector-general of Hungarian cavalry. It is formed in 2 brigades of 5 regiments of Hussars each, the commanders of which, colonels or generals, are under the inspector.

Each regiment is divided into 2 divisions of 2 squadrons, giving a total of 40 squadrons.

In peace time each regiment has a permanent staff cadre of 8 officers and 11 men, and a squadron cadre of 2 officers and 35 men.

On a war strength the Hungarian Landwehr comprises—

92 Battalions in first line of 4 companies intended to be at once formed into division.

32 Battalions in second line of 4 companies.

94 Depôt Companies.

Each battalion has a strength of—

Officers	22
Men	954
Horses	23
Vehicles	8

A depôt company has—

Staff	Officser	3
	Men	8
	Officers	3
	Men	223

If the strength becomes more than 300 a second company is formed.

The total of the infantry is—

124 Battalions	Officers	4,048	124,648
	Men	120,600	
	Horses	3,082	
	Vehicles	992	
94 Depôt Companies	Officers	564	22,278
	Men	21,714	

The battalions in first line are formed in 9 divisions of 3 brigades each, which have a place in the 42 divisions of infantry, which constitute the field army of Austro-Hungary and form the third division of army corps. The artillery engineers and auxiliary services are furnished by the active army.

The cavalry 4 squadrons, either by the Landwehr or active army.

The battalions in second line or either to form reserve brigades and divisions, or to garrison large towns or fortresses.

* Now believed to be replaced by "regiment."

The cavalry consists of 10 regiments of Hussars, of 4 field and 1 depôt squadron, giving a strength of—

Officers	300
Men	7,070
Horses	6,480
Vehicles	19

The 4th section of the 4th squadron in each regiment is a pioneer section provided with the tools necessary for forming communications and telegraphs. In the first 3 squadrons 5 men in each have entrenching tools.

The general strength of the Austro-Hungarian army is as follows :—

Active Army	Staff ...	Officers	... ...	2,760	6,154
		Men	... ..	3,394	
		Horses	... ...	5,666	
	Infantry	Officers	... ...	12,020	562,817
		Men	... ...	550,797	
		Horses	... ...	15,630	
	Cavalry	Officers	... ...	2,337	63,919
		Men	... ...	61,582	
		Horses	... ...	61,295	
	Artillery	Officers	... ...	1,991	78,896
		Men	... ...	76,905	
		Horses	....	49,216	
		Guns	... ...	1,540	
	Engineers & Technical Troops	Officers	....	636	26,180
		Men	....	25,544	
		Horses	... ...	2,837	
	Train ...	Officers	... ...	800	38,900
		Men	... ...	38,100	
		Horses	... ...	43,353	
	Auxiliary Services	Officers	... ...	6,193	34,800
		Men	... ...	28,607	
		Horses	... ...	1,075	
	Cis-Leithan Landwehr	Officers	... ...	2,350	147,754
		Men	... ...	145,404	
		Horses	... ...	6,070	
	Hungarian Landwehr	Officers	... ...	4,982	155,056
		Men	.. ..	150,074	
		Horses	... ...	16,742	
	Tyrol and Vorarlberg	Officers	... ...	450	20,970
		Men	... ...	20,520	
		Horses	... ...	320	
	Gendarmerie	Officers	... ...	174	6,338
		Men	.. ...	6,164	
			TOTAL ...		1,141,782

men with 202,204 horses and 1,540 guns.

This is the field army which Austro-Hungary can place in the field when its formation has been fully developed, without counting the reserve and garrison troops.

THE ANNAMESE ARMY IN 1885.

By Major D. von Strautz.

Abridged from the German by Sergeant J. J. Kônigs, B.U.L., and Librarian of the I.B. of the Quarter-Master-General's Department.

The Indo-Chinese peninsula has, during the past few years, been the scene of important political events, which have caused many changes in the Government, and have to some extent thrown open the country to European communication.

Annam itself has by the recent treaties become almost a French feudatory state.

It consists of a comparatively narrow strip of coast land stretching nearly due north and south between the China Sea and the coast range skirting the left bank of the Mekhong.

The inhabitants of Annam, although mainly of Mongolian stock, present great differences both physically and mentally. The inhabitants of the hills are, as a rule, of taller statue, fairer complexion and ruder habits than those living in the plains, and many of these hill tribes still lead a nomad life. The civilised Annamese, although they are more advanced socially and are more industrious, are at the same time less truthful and honest than the *Moi*, as the hill tribes are collectively called.

The Annamese are idle, luxurious, and incapable of deep emotion; but they are deeply attached to their native country and homes, and cannot remain away from home for any length of time. On the whole they are of a mild disposition, not to say apathetic.

The Government is an absolute monarchy, as is generally the case in Asia. The reigning king, whose power is despotic, bears the surname of "*The son of heaven*;" and is never called by his proper name, as this would be considered profane.

The army is under the command of the king.

The whole Annamese army consists of 40 regiments, which are divided into 5 divisions of 8 regiments each; the divisions are commanded by Grand Mandarins, who bear the title of Marshal, and are, at the same time, military governors of certain districts.

The most powerful of these Grand Mandarins is the Marshal-General, who commands the Royal Guard. The other Grand Mandarins command the troops stationed at Hué, and those in Northern, Southern and Eastern Provinces. The Brigadiers, Regimental Commanders, Captains, &c., are under the command of the Marshals. The Royal Guard is in reality meant for show and to provide appointments for favorites.

The Royal Guard is composed of life guards, lance bearers, color bearers, keepers of the insignia, and other officials, such as are only to be found in the train of an Asiatic despot. Besides these, there are whole parties of huntsmen for large and small game, armour bearers, umbrella bearers, sedan carriers, fishermen, gardeners, tea-makers, "swallow-nest" cooks, musicians, actors, dancers and watchmen for the temples, &c.

The strength of the Royal Guard is 7,450 men, who are only maintained for the above purposes.

Besides these, there is a garrison of about 43,000 men in the capital, which is mainly composed of followers and attendants of the princes and nobility.

When the citadel at Hué was attacked, these troops offered a very creditable resistance, and fought well while under cover.

There are about 54,000 more troops in the Northern and 18,000 in the Southern Provinces.

The total strength of the Annamese army is over 130,000 men, but in time of peace the greater part is on leave, the remainder being employed at the Harbours, Custom Houses and Post Offices.

The artillery consists of bronze and iron guns, which are 80 cm. and 3 wm. in length respectively, with a calibre varying from 4 to 43 cm.

The troops are armed with rifles and guns of the latest as well as of the oldest pattern.

Annam possesses a fleet of seven sailing corvettes, with crews of from 120 to 200 men, each carrying 28 guns; 300 junks, small and large, with an armament of two to six guns, and a crew of 40 men each; also two steamers, which were purchased in Hong-Kong, and five vessels ceded by France in 1876. These vessels are said to be in a most dilapidated condition, and the sailors are reported to be indifferently trained. The fleet is laid up along the banks of the Hué River in the winter season from September to March; the total strength of the navy is said to be 16,000 men.

The Annamese soldiers are perhaps neither better nor worse than other soldiers. It is true that they are wanting in energy and pluck, but they have shown, when properly lead and disciplined, they can behave better than most Asiatics, as they do not fear death.

Besides the regular army there is also a militia for service in each Province, the strength of which varies according to the size of the Province. This organisation is a great burden on the population. The pay of the militia is quite insufficient, and the consequence is that the people of the place where the militia is garrisoned are compelled to maintain them.

Elephants are employed for military purposes in the Annamese army. Formerly the Annamese army had 800 elephants; of these 120 were placed at the disposal of the king, under the orders of a Grand Mandarin.

There are four men to one elephant; these men have to gather in the hills the necessary food for the elephants. The king alone is entitled to keep an unlimited number of elephants, and is the only person who is allowed to wear orange-colored clothes. Princes are allowed to keep only one or two elephants; private individuals are not allowed to keep any.

Occasionally manœuvres (called minor wars) with elephants are carried out on the drill ground between the river and *enciente*. To a foreigner these manœuvres appear a farce, but they are only intended to accustom the elephants to artillery fire. Dummies made of straw represent the enemy. Soldiers armed with muskets and lances are placed in the intervals between the elephants for the purpose of driving them forward. They advance with their battle cry "hé-gia-ha." Some of the elephants charge the enemy, while others turn about and run away.



A MEMORIAL TO THE LATE SIR CHARLES MACGREGOR.

A MEETING was held at the rooms of the United Service Institution of India on Friday, 20th May, at which His Excellency Sir Frederick Roberts presided, to discuss arrangements for raising a memorial to the late Sir Charles Macgregor. Among those present were His Honor the Lieutenant-Governor of the Punjab, the Hon'ble General Chesney, Major-General Elles, General Chapman, Mr. H. M. Durand, Major-General T. P. Smith, Brigadier-General Nairne, Colonel Ben Williams, Colonel Collen, Colonel Higginson, Colonel Bushman, Colonel F. Lance, and more than thirty others.

His Excellency the Commander-in-Chief opened the proceedings by saying :—

I think this is a very representative meeting, and any conclusion we arrive at will be generally accepted by the majority of the subscribers to the Sir Charles Macgregor Memorial. We have met here to commemorate the memory of a man for whom we have all the very greatest respect and admiration, and I am quite sure that, when the object of this meeting is known throughout India, a very large number of subscribers will be found to join with us in commemorating the memory of so distinguished a soldier. I should like to know what you think would be the best mode for us to proceed. There have been four proposals made, and I dare say we might now appoint a Committee of gentlemen whose time is not so occupied perhaps as that of the rest of us, and they would consult with people at different stations and let you know what their views were. Four proposals have now been made, and I do not know whether we are in a position to say which of these four is the most suitable, or whether you think it would be better to wait till the matter is thoroughly ventilated and the Committee have had an opportunity of ascertaining the wishes of other people. The following proposals have already been made :—

1.—The establishment of a scholarship either at the Royal Military College, Sandhurst, or at the Staff College, for excellence in military reconnaissance.

2.—The striking of a gold medal, to be offered yearly for competition in India under conditions that will be decided by the Council of the United Service Institution of India, coupled by a money grant, accompanied by a certificate, to the native soldier who, during the year, has rendered the most efficient service in exploration and reconnaissance.

His Excellency also read a telegram from Colonel Eardley Wilmot approving of the above proposals and suggesting that a statue should be erected in Westminster Abbey or St. Paul's ; and also a letter from Captain C. V. Hume proposing a memorial in connection with

Marlborough College, such as a scholarship to be competed for annually by boys electing a military career, the examination to be carried out in the same manner and in the same subjects as at Woolwich and Sandhurst. If this was agreed to the Head Master to be communicated with to ascertain what was most needed in the school.

These are the four proposals. I have got another one suggesting that we should have a picture. It is rather a difficult matter to decide what would be best.

Mr. H. M. Durand: I think it would be better to get as many opinions as possible beforehand. So much would depend on the amount of money collected.

General Elles: I think there is a great deal to be said in favor of associating the memorial with reconnaissance, because if there was any matter in which Sir C. Macgregor was a leader it was in that particular line. You may remember that, during the campaign in Bhutan, during a time when there was little doing, he and a brother officer were absent reconnoitring for some weeks, and at one time nearly lost their lives. They only escaped by capturing the sentry who challenged them. He was not a man who talked much of what he did, and the story is not perhaps generally known. I think considering that he was above all things a reconnoitrer it would be a pity not to have an expression of opinion at the present meeting as to whether the memorial ought to be associated with that subject.

His Excellency the Commander-in-Chief: I always thought myself that poor Sir Charles Macgregor's life was really lost through his last reconnaissance in Beluchistan, shortly after, and from the effect of which, his companion Major Lockwood died. There can be no doubt that he was *facile princeps* of all our reconnoitrers.

The Hon'ble General Chesney: I think, Your Excellency, that whatever may be the practical form which the memorial takes, there is a great deal to be said in favor of having a memorial in the shape of a picture or statue. I myself think it would be best to have a picture kept at Simla, which is the head-quarters of the Army and of Indian society, where any one coming to Simla would have a recollection brought to mind of the man himself. Sir Charles Macgregor was a man whose name was very well known, and if there is any old Marlburian who would take up the matter there might be a very large number of subscribers, and we might have both the picture and some other memorial in the form of a prize to the Army. I am very strongly in favor of having in any case a portrait.

The question being asked where the portrait should be put General Chesney said that if their institute had an appropriate location that would be the most suitable place, but without that perhaps the Simla Town Hall was the best place where every one would see it. The picture could easily be taken from a photograph, of which there were several.

Mr. Durand thought that Sir Charles Macgregor's own wish would have been that the larger portion of any money obtained for a memorial should be spent on something that would be of practical use to the

Army, and therefore it was important not to swamp that object by spending too much on a picture or statue, otherwise he had no objection to the latter.

General Chesney said that, if they consulted the individual wishes of distinguished men, they would probably have no pictures or statues at all. The Gordon Memorial was a case in point.

Mr. Durand: You cannot expect to get nearly so much money in this case as for the Gordon Memorial, and, if you have to decide between two objects, I think you should take the one that is of use to the Army rather than the picture. If you can have both I agree that it would be very desirable.

General Chapman: I do not think many soldiers would have an opportunity of seeing the picture of Sir Charles Macgregor at the Town Hall, and the Army would know very little about it.

His Excellency the Commander-in-Chief said that, as far as he could ascertain, the general idea was in favor of some commemoration memorial in India, and that it should be associated with reconnaissance in some shape or other—a gold medal for officers and a silver medal for natives, or something like that, which could be decided afterwards. If the meeting decided whether that was acceptable or not then the Committee could lay it before the public. Of one thing he was very sure, and that was that it was the general wish to have it in India where Sir Charles Macgregor's name was better known than elsewhere. It was not perhaps generally known how much the United Service Institute owed to Sir Charles Macgregor. His whole heart was in it, and he never ceased to labor for it.

If it was agreeable to every one then he thought the proposal circulated might be made in connection with this Institute. He would like those who were in favor of going on this line and of having something in the shape of reconnaissance to hold up their hands.

The proposal was carried almost unanimously.

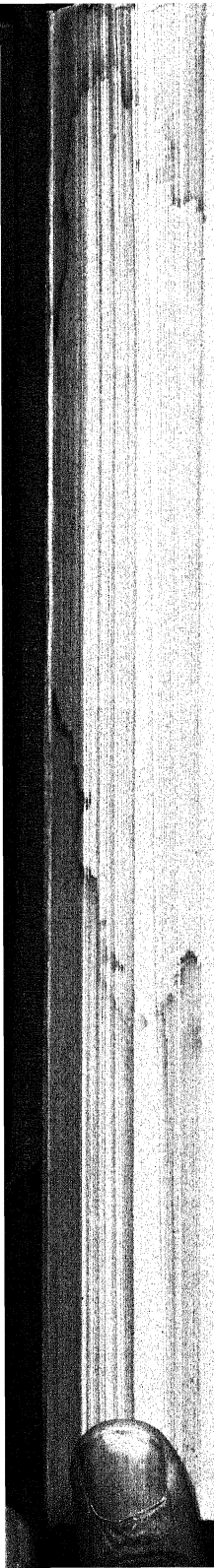
His Excellency the Commander-in-Chief: If we get enough money then I agree with General Chesney that something in the shape of a portrait would be very good. The next step will be to circulate subscription papers, and in another month or six weeks we can hold another meeting to decide farther.

General Chesney: I think we should have a large and representative Committee with working Sub-Committees.

At the suggestion of General Elles His Excellency the Commander-in-Chief consented to be President of the Committee. The Hon'ble Mr. J. B. Lyall and the Hon'ble General Chesney consented to be Members of the Committee.

It was then agreed that Colonel F. Lance should ascertain the names of gentlemen willing to serve on the Committee.

A subscription list being opened a sum of nearly Rs. 1,800 was promptly subscribed, after which the meeting separated.



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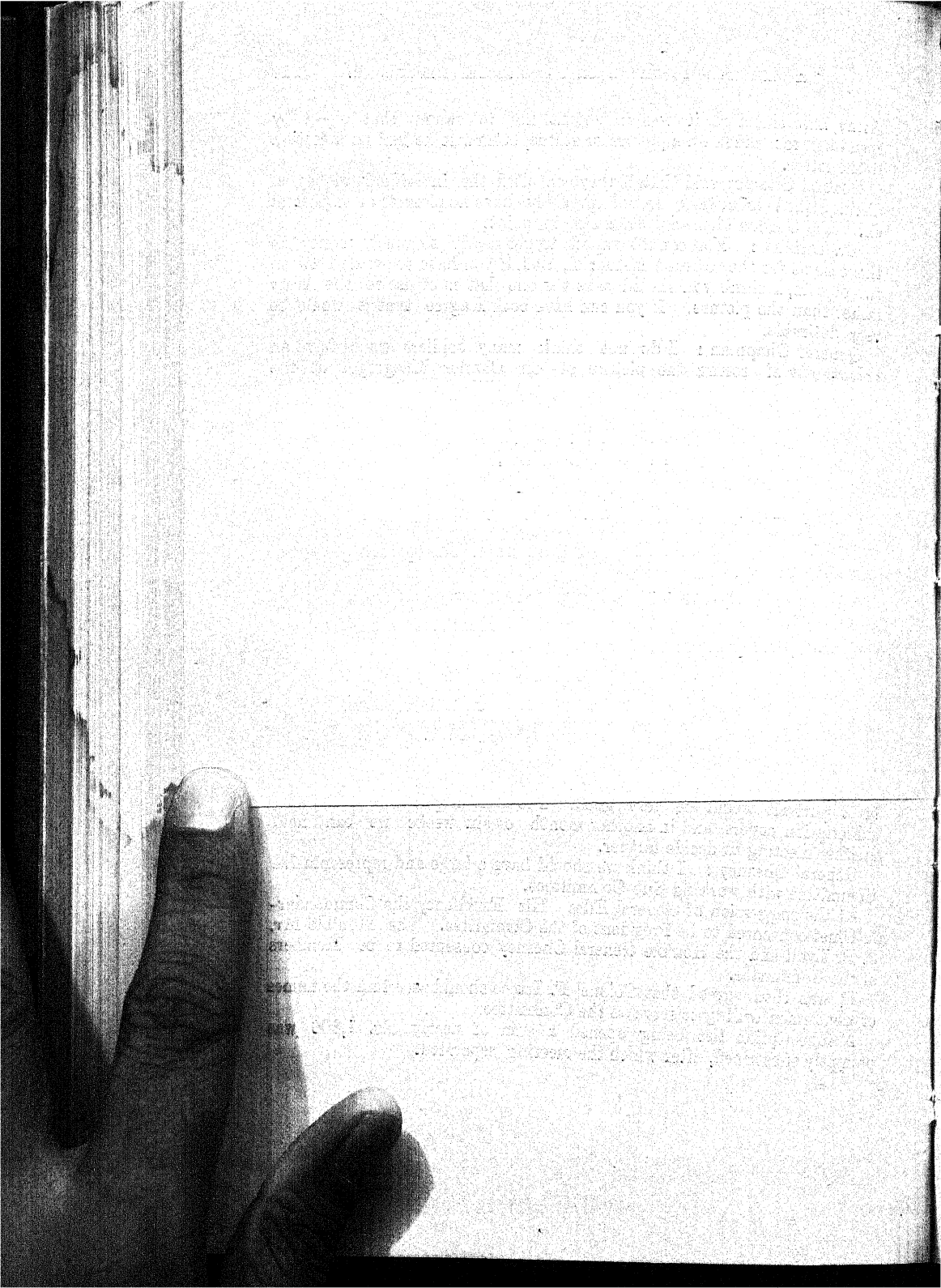
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By Order of the Council,
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Secy., U. S. I. of India.

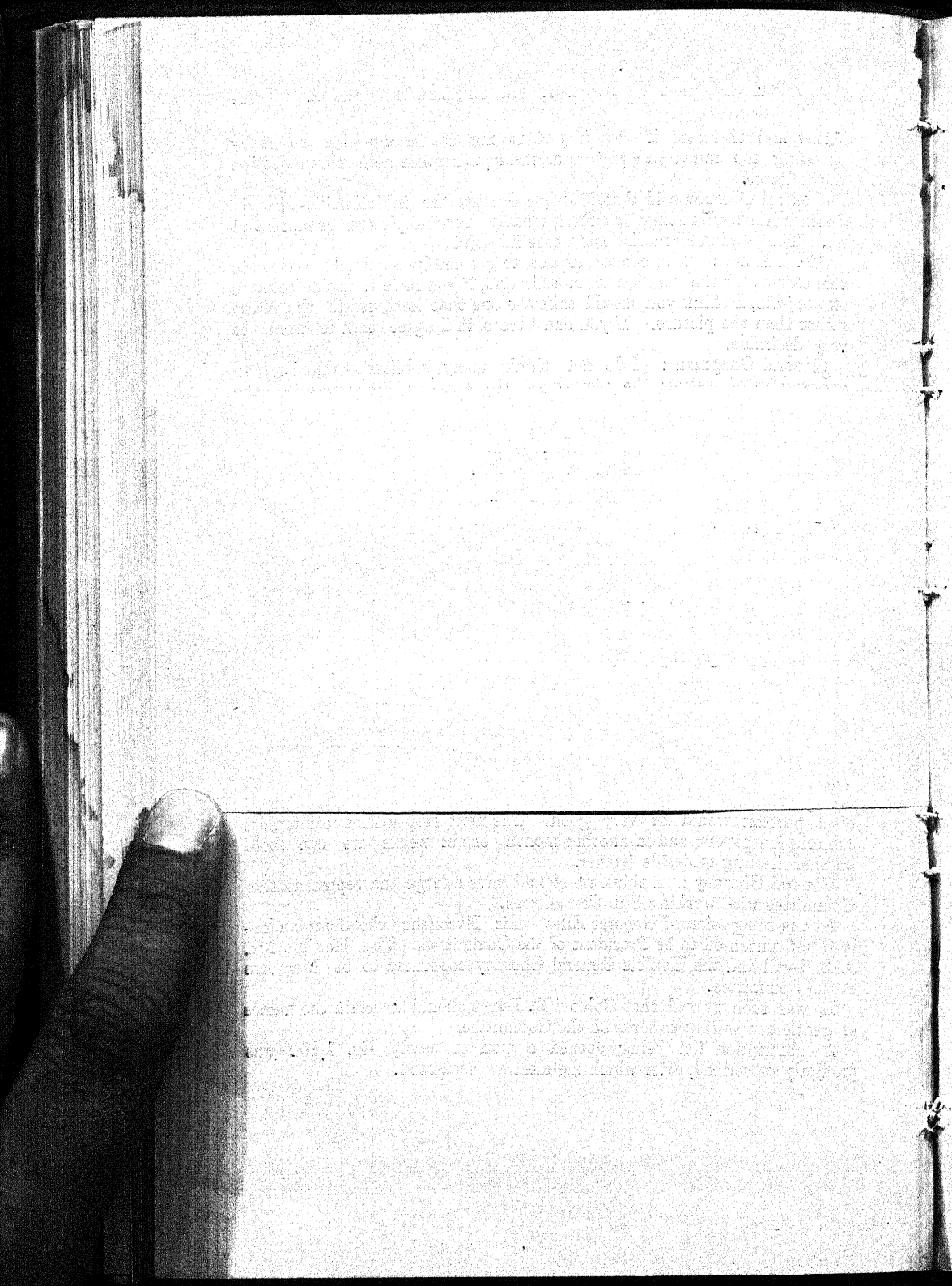
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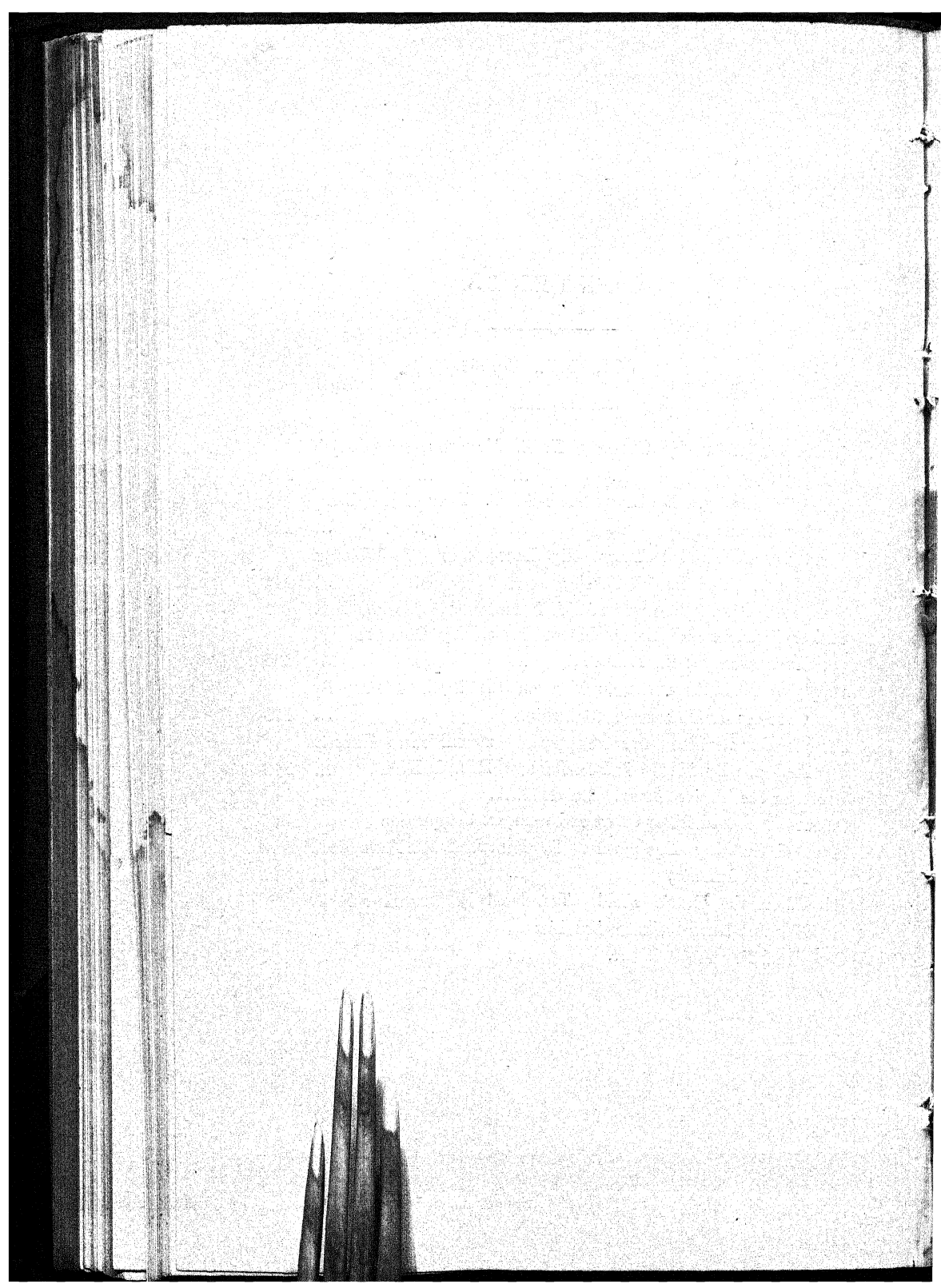
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The Journal
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VOL. XV. 1887. No. LXVIII.

JAPAN.

BY CAPTAIN H. B. URMSTON, *6th Punjab Infantry.*

NOTICE.

All back numbers of the Journal will be sold to Members at quarter price, *viz.*, 4 annas per number, plus postage, up to 31st October next, after which date all numbers not taken by Members will be otherwise disposed of.

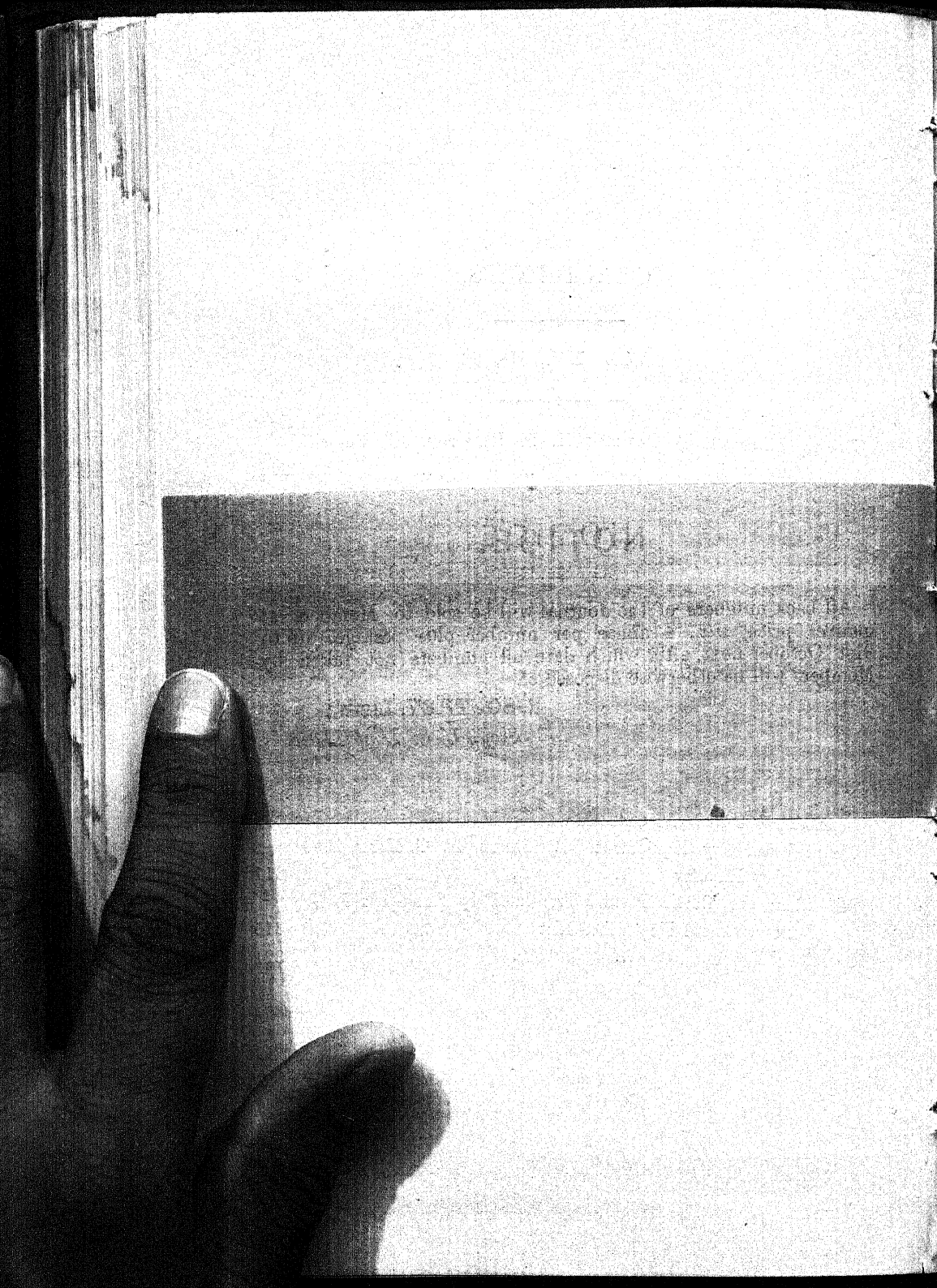
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Dutch settlements. Celebrated names. 1st Mikado Jimmu Tenno B. C. 660. Empress Jingu-Kogo conquers Corea A. D. 202. Successive supremacy of the clans Fujiwara, Minamoto, Hojo, Ashikaga, Taira, and Tokugawa. The Shoguns Yoritomo, Nobunaga, Hideyoshi or Taikosama, Iyeyasu, Hidetada. The Mongol Armada A. D. 1281. Battle of Sekigahara 1600. Massacre of Shimabara 1677. Legacy of Iyeyasu. The ancient classes Kuge, Doimios, Samurai and Heimin.

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VOL. XV. 1887. No. LXVIII.

JAPAN.

BY CAPTAIN H. B. URMSTON, *6th Punjab Infantry.*

These articles are an amplification of the lecture delivered before the United Service Institution at Simla on the 5th August, 1887.

Major-General W. K. ELLES, C.B., A.-D.-C., *Adjutant-General, in the Chair.*

The following outline was placed in the hands of members at the lecture :—

Reasons for lecture.—The Japanese Officers. Jinrikisha. Position of Simla in regard to Japan and England. Decorative arts. Increasing allusions to Japan. New route to India by Canada and Japan.

Geography.—Size. Number of islands. Cities and towns. Seas. Climate. Scenery. Volcanoes. Fujisan. Circuits, Provinces, Fu and Ken.

History.—Division into five periods from 660 B. C. to 1854. Marco Polo A. D. 1295, Pinto A. D. 1542, Xavier A. D. 1549. Portuguese and Dutch settlements. Celebrated names. 1st Mikado Jimmu Tenno B. C. 660. Empress Jingu-Kogo conquers Corea A. D. 202. Successive supremacy of the clans Fujiwara, Minamoto, Hojo, Ashikaga, Taira, and Tokugawa. The Shoguns Yoritomo, Nobunaga, Hideyoshi or Taikosama, Iyeyasu, Hidetada. The Mongol Armada A. D. 1281. Battle of Sekigahara 1600. Massacre of Shimabara 1677. Legacy of Iyeyasu. The ancient classes Kuge, Doimios, Samurai and Heimin.

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Present state of Japanese civilisation and the Christian movement.

Reasons for lecture.—There are several reasons why Simla seems a suitable place and this a suitable time for a lecture on Japan. It is the first place in India which official representatives of the Japanese Government have made their residence for any length of time. I refer to the three staff officers,—Captain Fukushima, Lieut. Tanaouchi, and Surgeon Sugenoya,—who were among us last year for six weeks, making themselves acquainted with the details of our military system, before touring through India. Their letters always recall gratefully the continuous courtesy and kindliness they received in this country from the Viceroy at Government House to the youngest subaltern who had the opportunity of entertaining them in his mess. Captain Fukushima writes that he has been "speeching" before various societies in Japan on his Indian tour, and always mentioning the kindness he received from "civil and military gentlemen." He is now military *Attaché* with the Japanese Embassy at the Court of Berlin.

Secondly, that humble but useful vehicle, the Jinrickshaw, of which so many are at the present moment standing outside the doors of this hall, and of which some 600 are in use by the residents of Simla, reminds us of the debt Simla owes to Japan. Starting in 1870 from the original idea of a straight-backed, cane-bottomed chair with the fore-legs cut off, a pair of shafts stuck on in front, and the whole on two flimsy wheels, without the vestige of a spring, improvements have been gradually effected until what may now be considered an extremely neat, comfortable, and commodious vehicle is to be found nearly everywhere throughout Japan.

The number plying in Tokio is upwards of 30,000, and in all Japan it amounts to over 180,000. No less than 2,245 were exported from Yokohama alone in 1885, chiefly to Shanghai, Hong-Kong, and the Straits Settlements, but many also to India.

Their cost for export is nearly £3, while in Simla they cost about Rs. 90. They are usually pulled by one man at a rate of 2*d.* a mile; while for rapid journeys two men are employed, running tandem. Jin-riki-sha is derived from three words, signifying respectively *man, power, carriage.*

Thirdly, it is difficult for any one, with the most superficial acquaintance of Simla drawing-rooms, to avoid coming to the conclusion that Japan shares with England the honor of decorating our show-rooms to the exclusion of almost every other country in the world. One is met at every turn with specimens of Japanese works of art, thus once more

emphasising what may be characterised as her second domestic claim upon us.

Fourthly, it has been usual to think of Japan as a country very far distant and at the other end of the world; whereas we find on consulting a map that it is only 50 degrees distant from India against the 80 degrees of England. So far, therefore, from occupying a central position between the two sets of islands, which are as harbour lights on either side of the Eastern Hemisphere, Simla is actually 2,000 miles nearer to Nagasaki than to Greenwich as the crow flies.

Again, it is almost impossible to take up a newspaper in the present day without finding a paragraph about Japan. Till recently mentions of Japan were few and of small importance; but we now find our public men making constant allusions to the country, such as those by Canon Westcott in his recent C. M. S. speech in London, and by Bishop French from a Simla pulpit.

Lastly.—We may say at once that the opening of the Canadian Pacific Railway has placed Japan in an absolutely different relation with India to that which she had previously occupied. The writer of the great Jubilee article in the *Times* of June 21st considers the opening of that railway and the establishment of a line of steamers connecting its western terminus with India and Japan "by far the most important "achievement of recent years. We thus gain not merely a shortened "route to the East, but one which passes entirely over great ocean high-"ways and British territory, instead of through a land-locked sea "and narrow gut which accident or design may at any moment render "impassable." He adds that, in view of the expansion of commerce during the last half century, and the immense undeveloped resources of Canada, it would be rash to set any limits to the future possibilities of the great Imperial highway.

These accounts, together with a paragraph in an Indian newspaper, appeared on July 22nd, the very day in which the notes of this lecture were submitted to the Council of this Institution. The latter paragraph told us that the "Abyssinia," the first of the new line of steamers from Vancouver's Island to Yokohama, had made the voyage in 13 days, and that the Captain believed it need not exceed 10 days. This means that it would be possible, with quick trains and careful arrangement, to send letters from England to Japan in twenty-four days *viâ* Canada, and troops within 30 days. The voyage from Calcutta to Hong-Kong occupies 14 days, and Yokohama is five days voyage beyond Hong-Kong. Consequently we may expect to see the voyage from Calcutta to Yokohama done in 19 days by such lines as the Pacific Occidental and Oriental S. S. Companies. This, with the 24 days beyond to England, places London within 45 days distance of Calcutta by the Canadian route.

A first-class passage from Calcutta to Yokohama cost Rs. 338-8. The passage from Yokohama to San Francisco is advertised at Rs. 563 and on to Liverpool at another Rs. 281, with a total reduction on the whole of Rs. 202 to officers of the United Services. The passage

from Bombay to Liverpool is advertised at Rs. 1,215-8, with a reduction to officers of Rs. 112-8, or by opium steamers of Rs. 957-4. The Canadian Pacific Railway say they can calculate on making the time between Japan and England less than 30 days for mails, passengers, and light freight. When there was cholera in Egypt last year troopships occupied about 62 days by the Cape of Good Hope, so that the new route would be at last 15 days quicker than that by the Cape. This very day a telegram has arrived telling us of cholera at Malta and another of the Parliamentary deputation which has waited on Lord Salisbury, requesting him to consider the new route for the Indian mails.

Over and above the reasons thus given for paying special attention to Japan at the present moment I may point out the many advantages which we in India possess for discussing the country and its people.

While in the matter of Geographical position, size, population, maritime habits, the defensive armament and policy of an island nation, we find an obvious comparison with our own islands, in respect to its Asiatic position, its religion, customs, agriculture and fiscal system, India has especial advantages for comparison not possessed by the British Isles.

Geography, Size, Population.—Japan, then, consists of four large islands—Hondu, Kiushiu, Sikoku and Yezo. Their area together is 148,456 miles with a population of nearly 38,000,000, while the area of our own islands is 120,000 square miles bearing a still denser population proportionately of nearly 35,250,000 souls.

Yezo —The island of Yezo is peopled by the aborigines of Japan, known as the Ainos.* It stands to Japan Proper much in the same relation that Iceland does to Denmark. It is governed as a colony, and its people differ entirely from those of the three chief islands of Japan, whose inhabitants profess a great contempt for the Ainos.

Islands.—Besides these four islands there are upwards of 3,000 small islands round the Japanese coasts, including the Riukiu (or Loochoo), the Kuriles (Chijima) and Bonin groups.

It will be rememebered that in 1875 Japan surrendered Saghalin to Russia, obtaining the eighteen uninhabited Kuriles in exchange, an arrangement much to the advantage of the greater power.

Towns.—The size of Japanese towns may be estimated from the fact that the thirty largest among them have a population of over 30,000 each. Tokio has a population of 902,837 and Osaka of 353,970. The thirty largest English towns after London bear a population of over 70,000 each.

Mountains.—A glance at a map will show us that the chief mountain ranges are, generally speaking, formed by the watershed between the Pacific and Japanese Seas, and stretch like a backbone through

* Miss Bird's well known book "Unbeaten Tracks" gives a good description of these tribes. For more detailed information the Japanese Asiatic Society's Journals may be consulted. A fresh work however on the Ainos has just appeared by Mr. Chamberlain.

the whole length of the islands. The whole empire may be called a mountain country, in which the level cultivated ground, including the artificial terraces, form not an eighth part of the whole land. In general the Japanese mountains follow the longer extension of the islands from N.-E. to S.-W. and combine tolerably lofty summits with low passes. Rounded mountain forms considerably predominate, and the mountain landscapes are not so much distinguished by magnificently wild shattered and disrupted masses of rock as by their charm and freshness. As in the case of its scenery so in that of its mountains Japan would seem to bear a closer resemblance to the Island of Sicily, in whose latitude it lies, than to that of any other country. Its volcanos are very numerous, and no less than eighteen are still active. Of these Asamayama in Kiushiu is the most imposing, and may be called the Etna of the land. In the number of its hot springs Japan is unrivalled. They may be counted by hundreds and are distributed over the empire. Sulphur springs predominate, but chalybeate and saline waters also exist, although few in number

Climate.—Generally speaking Japan may be said to enjoy a long comparatively cold and clear winter and a moist hot summer; it necessarily varies greatly, being Arctic in intensity in the far North Kurile Islands, while the Riukiu and Bonin groups enjoy perpetual summer. All the mountain ranges are wrapped deep in snow during the winter months, but in the valleys, plains and towns the sun's heat almost always melts the snow and prevents its lying throughout the day.

Fujisan.—It is impossible to leave the physicial features of Japan without mentioning the "peerless" Fujisan (commonly and erroneously called Fusyama), whose imposing figure amongst the holy mountains of Japan has been made familiar to us by its constant appearance on Japanese pictures and screens. Sixty miles from Tokio it rises majestically on a broad base to a height of 12,500 feet; an enormous number of pilgrims ascend it annually by four separate paths. No traveller approaches the Bay of Yeddo without warming into enthusiastic and romantic admiration as he catches sight for the first time of the snow-clad summit of the celebrated Fuji. Like a mighty sugarloaf struck by the first rays of the morning sun it is said to glow with a peach bloom red, or, as the day grows on, to stand out white and clear against the blue background of the Eastern sky. The last eruption of Fujisan took place in 1807, when the whole summit burst into flames. Rocks were shattered and split by the heat, and ashes fell in Yeddo, 60 miles distant, to a depth of several inches.

Scenery.—Of the Se Touchi or Inland sea of Japan the scenery is said to be unrivalled. Parts of the Mediterranean alone bear any comparison with it. Through this channel many of the steamers bound for Yokohama now pass. Of the land scenery, its lakes and its rivers, descriptions may be found at length in the current works of the day—a land of hills and valleys, of lakes and rushing streams. The lake scenery has been compared to that of Scotland, but the hills are neither so high nor so bleak as that of the heather country. Lake Biwa is 50 miles long by 20 broad.

It may further be mentioned that the Japanese have a troublesome and confusing practice of repeatedly changing the name of a river in its course and calling it after the various places it may happen to pass in its course ; on the other hand to their bays and straits they accord no names at all.

The hill scenery near Kioto, as well as throughout the province of Kiocho, is particularly fine ; a few of the provinces are flat. Shinamo, the tableland of Japan, rising 2,500 feet above the sea, forms the great watershed of Eastern Japan. The plain of Yeddo lies 1,800 feet below, from which the hills slope away northwards towards the province of Echigo.

Capes, Harbours.—Japan abounds in countless promontories and capes, besides being said to possess 56 large harbours. These are not accessible to vessels of large tonnage, but are admirably adapted to the accommodation of coasting junks and fishing craft.

The bay of Yeddo abounds with harbours. The inland sea is especially rich in this respect, Mitari and Takamoto being favourite places of resort for passing vessels.

The six treaty ports are : (1) Kanagawa (Yokohama) ; (2) Nagasaki ; (3) Niigata ; (4) Hiogo (Kobe) ; (5) Hakodate and (6) Osaka.

Minerals.—In its store of minerals, gold, silver, tin and lead, Japan is considerably supplied. In iron and coal the country is actually rich. Copper and antimony also are plentiful. It is computed that during the time of the Portuguese settlement, namely after A.D. 1600, £660,000 worth of bullion was exported yearly for 22 years. Gold is kept in the country as far as possible. The steel manufacture of Japan is celebrated in the Eastern seas, and the temper of the Japanese sword blades is as famous as those of Damascus and Toledo.

Under the tuition of the Portuguese, the Japanese also cast many bronze guns in the seventeenth century.

Fruits.—The fruits of Japan are the orange, apple, walnut, chestnut, plum, damson, peach and grape. Of these the plums are the best, and oranges rank next; but none are equal in quality to the same fruits in Europe.

Tea.—The tea plant is extensively grown. As an export it ranks in value only next to silk. In 1885, 40 million pounds of tea were exported valued at over a million sterling. As a beverage it is drunk by the Japanese without milk and sugar, and the prevailing use of this stimulant throughout Japan is well known. It is offered to a new comer, whether he pays a visit, enters a shop or takes his seat in the verandah of a Japanese tea-house.

Cotton.—Cotton was introduced from India in 799 A.D. and thrives, but of this more must be said under the head of commerce. It may be mentioned that 7,000lbs. of cotton seed were imported from China in a recent year.

Agriculture.—Japan up to the present time has not been regarded as a good pasture country. The reason assigned has been the deleterious character of the bamboo grass which covers the country.

Cattle.—Cattle-breeding lingers far behind agriculture as in most Buddhist countries. Live stock is the great need of Japanese farming ;

but the people are gradually changing their diet of fish and vegetables, and becoming meat-eaters, this being a return to their pre-Buddhistic habits. The consumption of beef especially is increasing yearly, while it is computed that the pastures of Japan are capable of keeping 28,000,000 sheep: she is obliged at present to import 55,000,000lbs. of woollen and mixed goods. The true wealth of Japan, however, lies in her agricultural, and not in her mineral or manufacturing resources. The Government have appreciated this fact, and several model and experimental farms have accordingly been established. Two thousand cattle and ten thousand sheep have at the same time been introduced from abroad.

Animals.—The oxen are small and sturdy. They are kept principally as beasts of draught and burden. The cow is not kept for its milk, and but little for the sake of its flesh; milk, butter and cheese are consequently wanting. Eggs, however, enter into the diet of the upper classes though not into that of the common people. I observe that in the year 1885 condensed milk to the value of 11,000 dollars was imported to the port of Hiogo. Ducks and game are commonly eaten, as also are monkeys, badgers and bears. A large number of monkeys especially are sold for food in the Tokio market. Their flesh is white, and said to be very palatable.

The other Japanese domestic animals are horses, dogs and cats. The horses, or rather ponies, are not powerful animals. They stand from 14-1 to 14-2 hands only. The dogs are much like Eskimo dogs, being usually white, grey or black in colour. Sheep and goats, donkeys, mules and tame geese are unknown. But the Japanese officers after seeing our mountain batteries reported on the advantage of introducing mule-breeding into Japan.

Birds.—Amongst the birds of Japan we may call attention to the well-known crane which is found on so many of our Japanese screens; the Tancho (*Grus leuchauchen*) is the national bird of the country. It is held sacred and regarded as a symbol of longevity; white in body with a red crown, black tail feathers and black upper neck, it forms the slender picturesque figure so favoured by Japanese artists.

Besides pheasants of two kinds eight specimens of wild geese, swans, mallard, widgeon, teal, woodcock, woodpigeon, plover, snipe, bittern, herons and white waders comprise their birds. The waders, herons (Sagi) and cranes (Tsurn) enjoy popular favour most, the silver herons accompanying the labours of the peasant through the rice fields as in India and Egypt. No other creatures, excepting perhaps the tortoise, are so frequently found represented in picture books and on the most varied products of their art industries; and no illustration give a better insight into the deep observation of nature and great talent possessed by the Japanese for representing vividly and truthfully what they have seen. The tortoise, bearing the name of Kame, is a symbol of long life and happiness, and is very often pictured with young ones upon its back. In many sacred temple tanks it leads, under the protection of priests and pious pilgrims, a happy existence and attains a great age.

One specimen of bittern, it may be here remarked, was deemed worthy of a special rank of nobility and is known as the Co-i-saga or bittern of the fifth grade, like our own Sir-Loin of beef, so knighted by Henry VIII.

Fish.—The old authors of Japan, as well as those of more recent times, have referred to the great importance of fish as the principal daily food of the Japanese people, and also to the remarkable variety which are brought into the markets of Japan.

In the multitude and variety of the choicest species of edible fish the Japanese and Chinese seas appear to be unexcelled in the world and inexhaustible. Notwithstanding the hundreds and thousands of persons employed in fishery no appreciable decrease has taken place after thousands of years.

The rivers are well stocked with trout, carp, shad, eels, &c., and those of Yezo with salmon. But these take a very subordinate position as compared with the wealth of the sea, which constitutes the principal daily food of the Japanese people. So far no less than six hundred species have been collected and described; of these a large number are brought into the markets of the country.

Bream, perch, mackerel, mullet, haddock and shad are among the chief species. The Japanese consider their Tai or golden bream (*Chrysophris cardinalis*) one of their best fish. Its padded representative, which we give as toys to children or hang on our walls, will recall it to English observers. The mackerel family are to be found in the markets of Japan nearly throughout the year, represented in about forty different species. So abundant is fish that fish manure is an article of standard manufacture, sale and use. The variety and luxuriance of edible sea weed also form a curious feature of Japanese life.

Flora.—For the flora of Japan I can only refer the reader to Rein's excellent chapters on the vegetation and the underwood, marsh and water plants, the Hara, the forests and plant life. He says that even more than by its wealth of species does the flora of Japan surprise and interest us by the great number and difference of its genera, and thus reminds us of the tropics rather than of any country of the temperate zone. In many respects Japan stands alone among extra-tropical countries.

The plum blossoms of February, the cherry of April, the lotus of July, the summer azalias, October chrysanthemums, December azalias and constant evergreens are familiar to us from the descriptions of every successive traveller.

Unlike India, Arabia, and Ceylon, Japan has few aromatic plants.

Her conifers are numerous, and the most frequent pines—Akamatsu (red) and Kuromatsu (black)—have been brought home to us by many a Japanese drawing. The pine tree and crane being symbols of longevity are embroidered on robes presented to young infants.

The willow tree and swallow, bamboo and sparrow, indicative of gentleness, are oftenest represented on screens, fans and other upright objects of household adornment.

The chrysanthemum is the national flower of Japan, as is the rose of England. It forms the Great Seal of the Imperial Government; it is embroidered on flags and banners and printed on official documents. The army now wear it in the front of their caps. When in A. D. 1331 the succession to the Crown was disputed, and there were two Courts, the northern and the southern, each side claimed the Imperial chrysanthemum.

Kuro-shiwo or Gulf-stream.—The Pacific, like the Atlantic, has its gulf stream; and the Kuro-shiwo, or Black-stream of Japan, has an interest beyond that of its importance for navigators.

Like that of the Atlantic, so the Kuro-shiwo owes its existence to the equatorial current, and the peculiar coast formation of the contiguous continent. Its course too is diverted by the axial rotation of the earth, and the influence of the monsoons.

It flows up past Formosa, Japan and the Kurile Islands, round by Alaska, Oregon, and California, and thence flows westward to the Sandwich Islands. So that a junk or tree left in the Kuro-shiwo off Kiushui would, if not stopped, drift round the river at from Japan to Hawaie.

In this manner for the past twenty centuries Japanese fishery boats and junks caught in the easterly gales and typhoons have been swept into the Kuro-shiwo and carried to America. A large number of junks have been known to have been wrecked on the American shores. And writers go so far as to say that all probabilities tend to demonstrate the Japanese origin of a large portion of the American native races. Arguments from language are also forthcoming, unaltered Japanese words and shortened forms being found in the vocabularies of Indian languages. Peculiar Japanese idioms, constructions and particles are found nearly identical in the Indian languages. The superstition, custom and religion of Japan bear an extraordinary resemblance.

Arguments from physiognomy are almost patent. Photographs of Colorada and Nebraska Indians when shown to Japanese are taken for their own countrymen. The work done by Kuro-shiwo in transporting the seeds and animals and men of the Asiatic to the American continent may be proved by the great similarity between the fauna and flora of the Pacific coast to that of Japan.

Divisions.—In the year 1872 Japan was divided into Fu and Ken, *i.e.* into three Imperial cities and seventy-two administrative districts. The latter were in 1876 reduced to 35 in number, answering to French præfectures or Indian districts. However the old division into nine circuits and eighty-four provinces by the celebrated Empress Jingu Tenno, and introduced by her after the conquest of Corea in A.D. 202, held sway for so many centuries that for the better understanding of the history and civilisation of Japan it is as well to record them.

The first circuit or *Gokinai* comprised the five home provinces in the neighbourhood of Kioto and Osaka.

The remaining eight circuits comprised the remaining seventy-nine provinces. Their names mark their positions in the country.

2.	Tokaido ...	Eastern Sea Road ...	(15	provinces.)
3.	Tosando ...	„ Mountain Road ...	(13	„)
4.	Hokurokudo ...	Northland Road ...	(7	„)
5.	Sanindo ...	Mountain Shade Road ...	(8	„)
6.	Sanyodo ...	„ Sunside Road ...	(8	„)
7.	Nankaido ...	South Sea Road ...	(6	„)
8.	Saikaido ...	West Sea Road ...	(9	„)

to which was added later Yezo Island; or

9.	Hokkaido ...	North Sea Road ...	(11	„)

These names recall in a measure the Afridi custom of calling their valleys and hills "by sunny side or shady side"—*pitau* and *geru*.

These ancient "circuits" still retain their names, although no longer administrative divisions, while the "provinces" have merely become geographical divisions of little importance.

On the other hand the recent arbitrary divisions of the country into Fu and Ken, subject as they are to change or modification, are of very subordinate value to the geographer.

History.—Just as it would be difficult, nay impossible, to give the slightest sketch of English history for a thousand years, say from King Alfred's reign to that of Queen Victoria in a few pages, and without the introduction of a certain number of names, so obviously would it be even more impossible to give the most elementary sketch of Japanese history for the greater period of two thousand five hundred years in the same space and without the introduction of a still larger number of names, which it would be difficult and probably uninteresting to make any attempt to remember.

I have, therefore, selected only a few names, namely those which have been connected with some of the most salient points of Japanese history, and can only endeavour, by dwelling on the events connected with those, to glide swiftly down the stream of Japanese history, and endeavour to give some idea of the sort of events which have composed its general character, and the condition of things in the past which has led up to that of Japan in the present, with which we are more immediately concerned.

FIRST PERIOD B.C. 660—A.D. 794.

From Jimmu Tenno and the founding of the kingdom of Yamato to the removal of the capital to Kioto.

Just as Romulus is the first name we connect with Roman history and the building of Rome in B.C. 753, so is Jimmu Tenno, first Mikado of Japan, the first name ever connected with Japanese history, dating from B.C. 660.

The foundation of the Japanese empire, therefore, is laid with the group which comprised Assyria, Media, Persia, Greece and Rome in contradistinction to the late group of Western powers which now dominate Europe, *viz.* England, France, Germany, Austria and Russia.

Grote gives the earliest authentic date of Athenian chronology as 683 B.C. The earliest Chaldean astronomical observation known to Pto-

lemy was that of an eclipse in 721 B.C. Babylon was only in its full glory from B.C. 600 to 580, and Crœsus did not found the Persian power till B.C. 594.

Among these the first date of Japanese chronology takes a central place, while those of the Western powers date respectively : Clovis, A.D. 594 ; Charlemagne 800 ; Egbert, 800 ; Ruvie of Russia 862, or twelve centuries later.

Japan then is the most ancient empire on the earth, and had its foundation in the days when Isaiah and Habbakuk were uttering their celebrated prophecies concerning the nations of the earth (B.C. 698—626).

China has changed her reigning dynasty repeatedly during the last 2,500 years, but for twenty-five centuries the family of the present Mikado presents in authentic history an unbroken line. He not merely claims a pedigree stretching back to B.C. 660, but no one can call in question the unparalleled claim.

It dwarfs the antiquity of the oldest royal family in Europe. The Mikado himself is believed in Japan to be the lineal descendant of the last of four gods, who succeeded the Sun goddess Tensho-Daijin, believed to be the daughter of the god who created the world. Of this divine race of sovereigns Jimmu Tenno was the first, and the present Mutsuhito is the 123rd in lineal descent. The goddess Tensho-Daijin accordingly holds the highest place in the Shinto worship of ancestors.

In the Mikado's proclamation of 1872 occur these words : "My house, that from Jimmu Tenno on to the present day, has ruled over Dai-Nippon according to the will of the gods * * * " thereby assuming it to be the oldest dynasty on the face of the earth, and carrying it back ten thousand years to the time " when our divine ancestors laid the foundation of the earth."

Mikado.—The word "Mikado" is derived from "Mi "= exalted ; "kado" =door, as in the "Sublime Porte," or the "Janab-i-ali," nearer at hand. The idea conveyed by the term in each case is that the titled one is too lofty to be named directly or otherwise than figuratively.

The Japanese always call their country Nippon, or sun rising, from the words "Nitsu"=sun and "hon"=rising or origin.

Japan.—Marco Polo in 1385 introduced Japan to the notice of Europe. When visiting the court of Manchuria he met ambassadors from the island kingdom of Zi-pangu, the Chinese designation Zhi-pon-kue or Ji-pon-kwo, from either of which the transition to Japan is easy.

Jimmu Tenno.—Jimmu means "the war spirit" ; Tenno. "king of heaven." By the latter title every Mikado is regularly called. Early history records how Jimmu Tenno, landing from Hinga in the Bay of Osaka, subdued the neighbouring district, and became a powerful as well as enlightened prince. He overcame his foes, assured peace to the country far and wide, and developed the peaceful industries of his kingdom.

His title, Jimmu Tenno, is the posthumous title under which he

has continued to live in history. It was given to him centuries afterwards, when the long Japanese names of the Kojiki or sacred book were abbreviated. His original name was Kan Yamato Iware Hiko No Mikoto.

The first period of Japanese history accordingly comprises that from the foundation of the Yamato kingdom (or Land of the Mountains) in Gokinai, together with Jimmu's capital at Kashiwara in the year B.C. 660, to the removal of the Royal residence to Kioto in 794 B.C. Here his successors dwelt till A.D. 1868.

Conquest of Corea.—Next to the foundation of the empire and dynasty the most noteworthy event in this first period of Japanese history is the partial conquest of Corea by the Empress Jingu Kogo in A.D. 202. She, fulfilling an old and favourite idea of hers, as soon as she became Empress, fitted out a fleet, and herself, clad in armour, took the chief command, and sailed away to Shiraki (Corea). The King of Shiraki in alarm begged for peace, sent gifts, promised tribute and gave hostages. The Empress returned with her fleet, her gifts and her hostages to Kiushiu. Amongst other reforms derived from her Corean conquest she divided Japan into the circuits and provinces, whose names have remained till the recent revolution of 1868.

The conquest of Corea has ever been regarded as an event of incalculable importance for the later development of Japan. Corea became the connecting bridge over which eventually the whole civilisation and culture of China made their way into the land of the Rising Sun, with Buddhism and the philosophy of Confucius as their vehicles; and with these the language and literature, the domesticated animals and cultivated plants of China, as well as its peculiar and extremely interesting industries.

Thus, although in the succeeding centuries numerous expeditions and many a conflict are associated with this transmarine possession down to the present era, and the dependency of the Corean rulers upon Japan has become more and more relaxed until it has been completely dissolved, yet their relations with the Asiatic mainland lasting for centuries were the means by which new life was inspired into the old barbaric condition of Japan.

SECOND PERIOD. A.D. 794—A. D. 1199.

Kioto the Capital.—The Fujiwara, Taira, and Minamoto supremacies—Establishment of the Shogunate and dual government.

Kioto.—The second period of Japanese history commences with the foundation of the Heianjo or "City of Peace," namely, Kioto on the right bank of the Kamogawa river in A.D. 794 by Kuwammo Tenno, 50th Mikado. Kioto signifies the "sovereign's residence." Here until A.D. 1868 his successors dwelt, and as the continued seat of spiritual sovereignty it may be called the Rome of Japan.

Fujiwara.—The family of Fujiwara (Wistaria field) is the oldest in Japan, next to that of the Mikado. It has always played a distinguished

part in Japanese annals, and down to the present day enjoys many privileges. It was founded by Nakatomi, who was allowed to adopt the title of Fujiwara in recognition of his services as Councillor to the 38th Mikado (A.D. 662—670.)

For many centuries the Fujiwara clan held possession of almost all the high and civil offices, and during the 9th, 10th and 11th centuries held the government in their hands. Although their star began slowly to pale from the time of the Chief Councillor Tokihira in the middle of the 10th century, their influence continued to that of the 74th Mikado in A.D. 1108. Their family is the first brought prominently to our notice as Mikado-makers, recalling the *role* played by our own Earl of Warwick three centuries later.

At the present time ninety-five out of the one hundred and fifty-five families of the Japanese aristocracy (Kuge) are Fujiwaras in name and descent.

Their power gave way to that of the Tairas and Minamotos owing to the fact that leaders from the latter clans were usually chosen as generals to direct the expeditions sent by Government, and thus becoming inured to war grew up a hardy set of warriors. The Fujiwaras, on the other hand, grew wedded to Palace life at the seat of Government, and preferred the luxury of court to the discomforts of the camp and the dangers of the battle-field.

In the beginning of the twelvth century feudalism and military despotism came to the front; the influence of the Fujiwaras at court was reduced to a shadow, and the authority of the Mikado at this period was compared by an old Japanese historian to an empty cash-box, of which the Fujiwaras carried the key.*

Taira.—The Taira ("Peace") are first brought into prominence in the person of Kika Taka Mochi, great grandson of Kuwammu Tenno, in A.D. 889. They held the Government in the south-west of the empire, while the Minamotos in the north-east gained military glory as brave generals. Meanwhile these houses maintained a tolerable understanding, but gradually, as their leaders began to lust after the high offices and influence held by the Fujiwaras, violent rivalries and enmities broke out, which kept the country in agitation for centuries.

The conflict which broke out between the Taira and Minamoto clans, with their Hei and Gen, or red and white flags, for superior power, bears the name of Gen-Pei-Kassen, or "Source," "Peace," 'Duel," from the words Minamoto=Source, Taira=Peace, Kassen=Conflict.

Our own Wars of the Roses and those of the Guelphs and the Ghibelines are short compared with this bitter feud of the Japanese Middle Ages, which may be said to have lasted under varying circumstances from the year A.D. 1156 for centuries.

The Taira Kiyomori had by his military prowess and energy crushed the power of Yorinaga, the Fujiwara Chief and the Minamotos acting

* Compare a description of the Indian Government given by a speaker at Simla in 1878, namely that of a gigantic office-box tempered by the occasional loss of the key.

with him. He had thereby raised himself to the office of Daijo-Daijin, or Chief Minister in A.D. 1167. By the battle which had been fought, the Taira party had obtained possession of the Imperial Palace, thus giving them the supreme advantage and prestige which always afterwards remained with the party in whose hands the Mikado was.

In A.D. 1159, Kiyomori succeeded in finally crushing the power of the Minamotos, and became the virtual ruler of Japan.

Not content with filling the offices at court with his own relatives, he determined to exterminate his rivals, the Minamotos, and accordingly caused to be murdered every one of the family that came into his hands. That he had not entirely succeeded in doing so was his dying regret in A.D. 1181. "Only strike off the head of Yoritomo, the Minamato, and place it on my grave" were his last words.

Minamoto.—The early youth and romantic history of Yoshitsune are worthy of a more prolonged reference than any which can be here accorded. How his mother, Tokiwa, fleeing from Kiyomori with her two children and the babe Yoshitsune at her breast, hurried barefoot across the fields, while the snowflakes were deepening in the ground. How, wandering worn out with hunger and frozen with cold, she met with one of the soldiers of her foe, who, moved by her condition and that of her children, offered her food and shelter; how she then learnt Kiyomori's designs; how she hastened to Kioto and sacrificed her own liberty for that of her mother and children; how these were sent to various monasteries; how her son Yoshitsune escaped in course of time from the monastic life, which his spirit has found so irksome; how at the age of 21 he had won a reputation for peerless valour and consummate skill as a soldier, and was the exemplar of the loftiest code of Japanese chivalry, the perfection of a Samurai,—these things are all more fully recorded in Japanese histories.

A native audience in Tokio to-day will strain and reach forward to catch the first glimpse of a stage personation of this great character; and the name of Yoshitsune awakens in the breast of a Japanese youth emotions that kindle his enthusiasm to emulate a character which was the mirror of chivalry.

This prince it was who became to his elder brother Yoritomo, as the historian says, a Ney to his Napoleon.

After the death of the Taira, Kiyomori's disaffection against the dominant family became general, and Yoritomo—the greatest in some ways of Tokiwa's children—responded to the appeal made to him to attempt the reduction, or even the extermination, of the Tairas. Yoshitsune joined him, but they met with victory only to be succeeded by reverses.

In a second attempt and with a better military organization, Yoritomo was more successful. He advanced through the Kuanto or eastern provinces of Japan, won new troops to his standards, and fitted himself and his army for the task of acquiring the country.

Meanwhile his brother Yoshitsune was advancing from Mutsan with an army, and his cousin Yoshinaka with another along the

the Nakarendo towards Kioto. Thus there were three Minamoto armies with their allies advancing irresistibly towards the south. Yoshinaka approached the capital first, and completely defeating the troops which Menamori, the Taira general, had sent against him. established the power of the Minamotos by this the most decisive battle of the Gen-Pei-Kassen in the year A.D. 1182.

The Tairas entirely evacuated Kioto, taking the child Mikado with them. The ex-Mikado was delighted to see the last of the Tairas, and a provisional government was soon formed in their place.

Yoshinaka meanwhile, intoxicated by success and caring little for his superior Yoritomo, two hundred miles distant, caused himself to be entitled the Sei-i-tai Shogun or "Barbarian-subjugating great General." He was previously called the Asahi Shogun or "Morning Sun General," on account of the suddenness and brilliancy of his rising. His arrogance, however, knew no bounds. He even imprisoned the Mikado Go-Shirakawa, and severely oppressed the Buddhist monasteries.

Beyond this, he further showed himself to be jealous of his cousin Yoritomo, and took up a hostile attitude against him. To Yoritomo accordingly the Mikado Go-Shirakawa appealed for assistance.

Yoritomo therefore sent an army against his cousin, commanded by his brother Yoshitsune. Yoshinaka marched to meet his relatives, was completely defeated near Lake Biwa in A.D. 1184, and thereupon committed *harakiri*, *i.e.* suicide.

Yoshitsune now turned once more against the Taira Chief Munemori, whom his cousin had previously defeated in 1182, and burnt to the ground the Taira Castle of Fukuvara.

The last despairing struggle took place upon the sea at Dan-no-ura, near Shimonoseki, a place which again became celebrated in 1863, when the combined squadrons of England, France, the United States, and Holland bombarded the batteries of the Chosiu clansmen.

The adherents of the Taira had gathered here in order to cross with their leader, their wives, families and children, in upwards of five hundred ships to Kiushiu.

Yoshitsune came after them "like the wind." The Taira clans were at bay, driven and pursued to the sea shore. The Minamoto army was unencumbered. They had seven hundred junks. Griffis, the American historian, gives an exciting account of the naval battle which ensued. The white flag of Yoshitsune eventually triumphed, and the extermination which Kiyomori the Taira had destined for the Minamoto was turned against the Tairas. Neither age nor sex was spared, and those who could not die sword in hand were mostly doomed to perish by other means.

Kiyomori's widow, with her grandson the child-Emperor (81st Mikado), leaped into the sea and was drowned (A.D. 1185.)

Munemori, the Taira Chieftain, was made a prisoner, sent to Yoritomo at Kamakura, and later on beheaded. For centuries afterwards, and even to the present time, the ghosts of the slain Tairas are present to the imaginations of mariners and peasants on the Choshiu shore.

A few of the Tairas escaped and fled to Kiushiu, where a few hundred of their descendants still remain, secluded from their countrymen in their mountain fastnesses for seven hundred years, and living on in poverty and pride.

Meanwhile Yoritomo had been moved by his brother's fame and success into jealously against Yoshitsune, whose personal bravery and military prowess had won to himself especially the enthusiasm of the Japanese for the house of Minamoto.

Yoritomo's breast was filled with envy and anxiety, lest, like that of Yoshinaka, the influential position of his younger brother also should be used against himself. He cast about therefore to get rid of him.

When Yoshitsune marched back in triumph to Kamakura to lay the trophies of his victory at Dan-no-ura before his brother, he was forbidden to enter the town, and obliged after long waiting and pathetic remonstrance to withdraw to his command at Kioto.

He was subsequently denounced as a traitor, obliged to seek an asylum with his old Fujiwara friend, the Governor of Matsu, by whose son—after the father's death—he was soon after ordered to be assassinated.

Another account says he committed *harakiri*; a third that he fled to Yezo, and lived among the Ainos for many years.

In any case the name of Yoshitsune has secured undying fame. Worshipped as a god by the Ainos, he is glorified in art, song and story. His features are pictured in boy's kites; his mien and form on household effigies displayed annually at the boys' great festival of flags. His name and deeds are held up as those of the "*Chevalier sans peur et sans reproche.*"

In A. D. 1190 Yoritomo proceeded in great state from Kamakura to Kioto to present himself before the reigning and great Mikado. The magnificence of his procession, and the wealth he exhibited, astonished even the oldest courtiers. He was accorded a brilliant reception. Fresh festivities and entertainments followed one another for a month. Valuable presents were exchanged, many of which are shown in the temples of Kioto and Kamakura at the present day. Yoritomo returned to Kamakura laden with honors. Kamakura lies a few miles west of Yokohama in the bay of Sagami. It soon became the wealthiest, and next to Kioto the most important town of Japan.

In A.D. 1192 the Ex-Emperor Go-Shirakawa died, aged 67. Immediately upon his death the 82nd Mikado Yo-Soba-Tenno sent to invest Yoritomo with the chief military dignity, *viz.*, that of Sei-i-tai Shogun, or Chief Chastiser of Barbarians. From this time the title of Shogun received a higher significance. Hitherto all generals had been called Shoguns, but from this time the dignity was changed, and becoming hereditary, the dualism in the State assumed a fixed and permanent form. In point of form the Shogun remained the first vassal of the Mikado; in point of fact he became the real ruler of the country, till foreigners supposed him to be a sovereign.

Yoritomo had acquired not only all the civil functions once held by

the rival Fujiwara, but more military power with them than even a Taira had ever wielded.

The Feudal system which had been developing itself for centuries now received systematic shape, and Yoritomo by appointing a military with a civil Governor over each province in the interest of good order gave it national proportions, so that in course of time it came to be regarded as the national constitution. These governors were chosen from among his own relations.

During the last ten years of his power he gave special attention to the internal administrations of the country, enabling it by the enjoyment of peace and good laws to recover from the calamities of its wars and renew a condition of prosperity.

Yoritomo consequently is looked back upon as one of the greatest figures of Japanese history; one of its ablest rulers and a consummate general. He is described as brave, imperturbably calm, and of great energy, ready to reward merit as well as to punish wrong.

That he combined with these high qualities, selfishness, suspicion, and cruelty is a fact too amply borne out by the treatment of his brothers, cousin and near relatives. History can never forgive his treatment of Yoshitsune in particular.

The great consideration Yoritomo invariably showed to the Court at Kioto is important. He never omitted to obtain the sanction of the Mikado for all his reforms.

To this precedent and the deference ever paid by succeeding Shoguns to the spiritual authority of the Mikado must be attributed the extraordinary continuance of power for seven centuries in the hands of the Shoguns. Without it they must have been regarded as usurpers, and followed their lot. The power of Cromwell and the Napoleons was short lived. Had Napoleon III not upheld the Papal power, it seems unlikely that he would have ruled even for 19 years.

The loyalty and allegiance of the people to their Mikado has never swerved. Great soldiers have made the Mikados their tools, but have never once attempted to call themselves Mikados.

Yoritomo died at Kamakura in A.D. 1199 owing to a fall from his horse.

The great city of Kamakura is now covered by rice swamps and millet fields; a large temple alone remains.

The events which led to the establishment of the Shogunate and Fendal system of Japan have been traced at some length, partly on account of their own intrinsic interest, but chiefly on account of the importance of the epoch in Japanese history, when the dual power was established. From the year A.D. 1192 the ruling power flows in two lines—spiritual and temporal—for six hundred and seventy-six years, only to be united, on the abdication of the last Tokugawa Shogun, in the person of the 123rd Mikado, Mutsuhito, A. D. 1868.

(To be continued.)

NOTE.—I cannot let these pages go to the Press without expressing my obligations to Professor Rein of Marburg for the assistance I have derived from his valuable work on Japan.

MOUNTED INFANTRY.

By Lieutenant A. C. Yate, 29*th Bombay Infantry*.

It is stated that, as the result of Major Hutton's lecture on mounted infantry at the Royal United Service Institution on 2nd June, 1886, a school for the training of officers and men in the duties of mounted infantry has been established at Aldershot. This being so we may assume that it is not improbable that a school for the same purpose will ere long be established at some station in India. In three campaigns in which Indian troops have taken part recently, *viz.*, the Egyptian, Soudan and Burmese campaigns, mounted infantry has been largely employed. The selection of a locality for a mounted infantry school in India would be based in the main on two considerations, *viz.*, the convenience of the place as a military centre and the fodder-supply thereat. These points, however, need not be discussed here.

Major Hutton in his lecture (R. U. S. I. Journal, No. CXXXV, pp. 695-701) states fully and tolerably completely the uses of mounted infantry both in operations against armies equal, or reputedly equal, to our own in drill, equipment and organisation, and against an enemy that is in each of those respects greatly inferior, or, in other words, against the troops of civilised and uncivilised nationalities. To these uses one addition may, I think, be made. In an action defeat may often be averted by the timely advent of reinforcements. Now-a-days, when armies are numbered by their hundreds of thousands and battle-fields extend over miles of country, to reinforce distant points with infantry is a matter of time, when time is most valuable. If, however, the commander of the army, or the commander of each army corps, had a sufficiently powerful force of mounted infantry at his disposal as a reserve, the reinforcement of a threatened point could be carried out with three-fold or four-fold rapidity. It is obvious that where large armies (say 200,000 strong) are engaged no small body of men would be of any decisive use for such a purpose. To be effective 15,000 or 20,000 men would be required, either to be retained under the orders of the Commander-in-Chief, or to be apportioned to the army corps commanders.

In a war with a European power the mounted infantry would be to the British forces what the Cossack is to the Russian, with that superiority that a better all-round military training gives. Our Indian cavalry, although undoubtedly an arm capable, if necessary, of great mobility, cannot be classed in the same category as the Cossack. In every respect as cavalry the former are far superior to the latter; but for dismounted fighting the Cossack has the advantage that the rifle confers when pitted against the carbine. But, on the other hand, mounted

infantry, irrespective of other important qualifications, is superior to the Cossack for dismounted fighting, in that his dress, arms and equipment are specially adapted for dismounted work, whereas those of the Cossack are not. For mobility perhaps the Cossack is not to be equalled, so inured is he by habit and practice to moving independently of transport and commissariat, carrying all that he and his horse require, for a time at least (to be supplemented, of course, from the resources of the country he is operating in) on his horse's back. Our soldiers, British or Native, are not habituated to moving thus independently; but there seems no doubt that our Indian cavalry and our mounted infantry could (provided they are properly equipped) prove themselves in point of mobility no mean rival of the Cossack. The recent long-distance rides (see Paper by General Bengough in No. 66 of the Journal of the U. S. I. of India and the Report compiled by Captain Dean-Pitt), which are the outcome of a General Order by H. E. the Commander-in-Chief in India (G. O. C. C., dated 2nd June, 1886), are an earnest of that. But our Indian cavalry is not, as has been already pointed out, so equipped as to be a match for the Cossack under all circumstances and in all places. When Anglo-Indian troops meet Russian it will be in Afghanistan, in Persia, or possibly in or towards the Caucasian Province. The Cossack will certainly be freely used for purposes of reconnaissance and raiding on our communications. Our Indian cavalry alone might possibly meet with discomfiture if it encountered Cossacks on ground unsuited to cavalry movements. To obviate such a mishap a combined force of cavalry and mounted infantry would prove effective. Recent writers on mounted infantry have specially dwelt on its value as a support to cavalry; and this is a case in point.

In all recent campaigns, whether in South Africa, Egypt, the Soudan or Upper Burma, mounted infantry has always, to the best of my knowledge, been raised and organised hurriedly to meet a sudden emergency. Naturally corps or companies so raised must necessarily have had to contend with many disadvantages, which might have been obviated had some adequate system of organisation been previously set on foot. There was little or no time for selecting the best men, or for giving them even a short course of drill and riding school, and as for equipment whatever came to hand first was impressed into the service. A man was given a pony, saddle and bridle, and then expected to go and do what he was ordered to do and learn his work in doing it. During the last seven or eight years the record of the services of the mounted infantry has, despite all initial drawbacks, been a brilliant one, so much so that the term "mounted infantry" conveys *per se* the notion of a *corps d'élite*. If such is the case, without a previous organisation and training, we may justly anticipate that a still more brilliant record of service will be the result when mounted infantry has become a recognised branch of the standing army. I say we may justly anticipate that such should be the case; but it is by no means a certainty that an improvised article may not prove superior to one most carefully formed and fashioned for a special purpose. So many things, so many controlling influences go

to constitute an efficient unit of the army. The officers and men may be good and well trained, but, to take mounted infantry as an instance, they depend on the Ordnance Department for their arms and ammuniton, on the transport for their animals, and on some department or other for their saddlery. Any one of these component parts may be unsuitable or defective, and so impair the efficiency of the unit. Still an equipment based on practical experiment, and the treatment, application or use of which the men have been beforehand taught to understand, should prove superior to one improvised on a moment's notice ; and *ceteris paribus* a trained and organised mounted infantry should be as superior to the offspring of a sudden need as a well-born-and-bred infant to a foundling. Still the foundling sometimes makes the better man of the two. However, now that mounted infantry is a question that is being taken up in earnest by the military authorities, we may expect ere long to have an opportunity of noting the working of a trained body of that arm and of comparing its performances with those of the extempore production of the past.

A point that is frequently and forcibly dwelt upon by most writers on mounted infantry is the difficulty of preventing that arm from degenerating into inferior cavalry. They instance the "Dragoons" of the early part of the century. I cannot but think that, as long as none but trained infantry soldiers are drafted into mounted infantry, that arm will not deteriorate into bad cavalry. In the recent operations in South Africa many cavalry soldiers were, I believe, employed as mounted infantry. Cavalry officers and non-commissioned officers may with advantage be employed as instructors of mounted infantry, but I do not think that the presence of a large number of cavalry soldiers in the ranks is either advantageous or desirable. The officers and men of mounted infantry should all, or almost all, be selected from the infantry. Naturally those officers would be selected who are good riders and have some knowledge of horse management. Knowledge of horses, however, unless combined with other essential qualifications, both of body and mind, will not make a good officer of mounted infantry. Infantry officers would have no tendency to turn their corps into a bad caricature of cavalry. Any mounted infantry that have operated with cavalry have very soon learned that they cannot possibly compete with that arm in its particular sphere and in good country. They are neither armed, mounted nor equipped for such work. Their best chance of doing good work and earning distinction is to confine themselves to the work for which they are intended. Cavalry can no more compete with them in their proper sphere than they can with cavalry in its own sphere. The infantry soldier with his rifle and bayonet is more than a match for the dismounted trooper with his carbine and his sword dangling between his legs. Or, if the sword be left attached to the saddle, the trooper is helpless for close-quarter fighting. In future wars between European powers we may, I think, expect to see mounted infantry used as an auxiliary of cavalry just as R. H. A. batteries now are ; and it will also be employed for scouting, reconnoitring and falling on the enemy's

communications. In this latter duty it will become a substitute for cavalry without usurping the *rôle* of the latter. It will be acting *for*, not *as*, cavalry. When working with cavalry it will be useful either to protect it from the enemy's infantry or to support it by its rifle-fire against the enemy's cavalry.

Now, although it is conceded that mounted infantry is not intended to act as cavalry, I do not admit that it should never overstep the narrow limits within which some wish to confine it. It is argued that, if it is once allowed to act as cavalry, it will insensibly degenerate into bad cavalry. Why not argue that cavalry acting as infantry will degenerate into bad infantry? As a matter of fact dismounted cavalry is merely inferior infantry, and *vice versâ* mounted infantry can at best be but inferior cavalry. Inferior however as the latter may be, there are occasions when its worst performance as cavalry may be better and more effective than its best as infantry. In Upper Burma the mounted infantry has been very frequently employed as *quasi*-cavalry; and where sword-bayonets had not been supplied the men in some companies were all armed with captured *dahs* (Burman swords). What is the most effective way of inflicting loss on a flying foe in a fairly open country? Is it best to dismount and fire a few random shots (probably without effect), or to scatter and pursue mounted? Practical experience has proved that the latter is the best. What has answered in Upper Burma will probably be found to answer in other countries and against other enemies. It should rest with the officer in command to decide at the moment whether mounted infantry can be most effectively employed, mounted or dismounted. Where adequate resistance is encountered it must adhere to its infantry *rôle*. If a body of the enemy of inferior strength, and especially if in retreat or flight, is encountered, then to attack or pursue mounted is most effective. In some cases a small body may dismount to attack and break the enemy, the remainder being held in reserve mounted and ready to pursue the enemy when broken. If mounted infantry is to act mounted it must be suitably armed. But of arms and equipment more anon.

The most recent writers on the training and organisation of mounted infantry are Major Hutton in No. CXXXV of the Royal U. S. I. Journal and Lieutenant G. J. Younghusband in No. 65 of the Journal of the U. S. I. of India. To the experiences previously gained in South Africa, Egypt and the Soudan may now be added those gained in Upper Burma, where the conditions of warfare have been of a quite peculiar type. No daring foe like the Zulu and Arab had to be contended with. Up to the close of the rainy season of 1886 the Burman certainly did show signs of a certain amount of spirit and enterprise, and had the courage both to resist and attack our troops. Then in October, 1886, came the reinforcements, and ere the end of the year there was no fight left in the Burman dacoit or rebel. His first aim then and afterwards was to keep at a safe distance from all British troops, and that aim attained to live at the expense of the villagers around him. The campaign in Upper Burma

of the winter of 1886-87 and the spring and summer of 1887 was nothing more than a pursuit. On both sides cunning was pitted against cunning, the one side to catch, the other to evade. Fighting in the real sense of the word (for it takes two to fight, as it does to make a quarrel) there was little. Still there is no doubt that the campaign in Upper Burma has trained, at least in a partial degree, not less than 2,000 men in the duties of mounted infantry. Men have learned to ride and to look after horses, and generally been accustomed to mounted infantry work. Here then we have a body of men ready to hand from which to form a corps of mounted infantry in India. Practical experience is worth more than any amount of theoretical instruction. Not to utilise the mounted infantry that has at much expense been organised and trained in Burma is to waste much valuable material. The material is there ready for use. Why delay using it?

There is, however, one experiment that has been tried in Upper Burma that should not be repeated, and that is the amalgamation of British and Native troops in one company. Corps or companies of British and corps or companies of Native mounted infantry may co-operate in the field just as battalions of British and Native troops are brigaded together. But let the two be distinct units. In respect of discipline, pay, rations, equipment, arms, ammunition, transport, stable management and every branch of interior economy let them be as separate corps. For drill and field operations they may, if necessary, be linked. It may be possible to have a company of 100 men, say 50 British and 50 Native soldiers. But the two half companies should be commanded each by its own officer, and in respect of every branch of interior economy should have nothing in common with the other. Oil will no more mix with water than British and Native soldiers will go through the routine of life in camp and barracks together without friction. The contact of the two is simply provocative of breaches of discipline, and punishments have to be awarded that would never have been required had the two discordant elements been kept asunder. I am aware that under certain circumstances Tommy Atkins and the Native soldier are very good friends. But when thrown together, as they have been in the mounted infantry in Upper Burma, reciprocal jealousies and susceptibilities are aroused, words are interchanged, words lead to blows, and blows to the cells. It is unfair to put temptation in a man's way. To amalgamate British and Native soldiers in one company is throwing temptation to misdemeanour in their way.

For the above reasons I consider that in future corps or companies of British and Native mounted infantry should be raised and organised independently one of the other.

One hundred non-commissioned officers and men is a suitable strength for a company of mounted infantry, and six such companies would form a battalion as large as the commanding officer could adequately control in the field.

Major Hutton recommends the formation in Great Britain of a brigade of four battalions, each battalion 530 strong, including officers. The estimate of the strength of mounted infantry required in India

should be framed proportionately to the military resources of the most powerful enemy that the Indian army may have to encounter. The greatest force that India might be called on to put into the field would be three or four army corps of 25,000 men each. Suppose that each army corps has one battalion of mounted infantry. To supply that we require two regiments of three battalions each, *viz.*, one regiment of British and one of native mounted infantry. One battalion of each regiment would be a depôt battalion, and furnish drafts as required to the two battalions in the field. If deemed advisable half a battalion of British and half a battalion of Native mounted infantry could be allotted to each of the four army corps. They might be attached to the cavalry division.

We want 1,800 men for each of these two regiments. Throughout 1886 several hundreds of British and Native soldiers were serving in the mounted infantry in Upper Burma ; in the winter of 1886-87 their number was increased to 825 (established strength), and in the spring of this year (1887) the number was still further increased (I have no means of access to statistics, but I believe the 3rd Brigade alone has 500 or 550 rifles) to replace the cavalry, which after all was not withdrawn. It is probable that a large proportion of the troops in Burma will be withdrawn by the end of 1887, and then the mounted infantry will be in great measure broken up (to be replaced by mounted police). On their return to India most of the men thus practically trained will be available for enrolment in a corps of mounted infantry if it be decided to raise one. After weeding out inferior men we may estimate that about 600 British and 600 Native soldiers, mostly picked men and having the advantage of practical training in the field, can be thus obtained. The remaining 1,200 British and 1,200 Native soldiers can be raised from British regiments serving in India and from Native regiments. The best Native material will probably be obtained from the frontier regiments, *i.e.*, the Punjab and Belooch regiments. About 200 rifles of the 1st Belooch Regiment alone have been trained in Upper Burma to mounted infantry work.

The best authorities agree that mounted infantry should be composed of infantry soldiers, thoroughly trained as such, and subsequently instructed in riding and stable management. Lieutenant Younghusband makes some remarks about special musketry training ; but mounted infantry requires no other musketry training than that which is, or shall be, hereafter found to render the infantry soldier most efficient. For the instruction in riding and stable management a special school is necessary. To attach mounted infantry men to cavalry for such instruction would never do. The cavalry would look on the whole thing as a bore, and as a natural consequence the mounted infantry would suffer both in efficiency and discipline. Major Hutton does not recommend the maintenance of a permanent corps, but the training in peace time of detachments from all regiments to be amalgamated into companies and corps in time of war. One, and the chief, objection to a permanent corps is expense. Expense is a matter that rests with the Finance Department. I think it will be generally admitted that a permanent corps will be found more efficient in war time than one composed of 20 or more detachments linked together

at short notice. The disintegrating effects of active service are only too apparent in a well-drilled battalion without trying experiments with a patch-work battalion. The Government of India has since April, 1885, found the wherewithal to add 10,000 British troops, three regiments of Native cavalry, nine or ten battalions of Native infantry, and an extra squadron in each existing regiment of cavalry, to the Indian army. It may possibly ere long find the wherewithal to raise six battalions of mounted infantry. In a patch-work battalion the commanding officer knows none of his subordinates, the men have no cohesion, the veterinary and farriery establishments are hurriedly and imperfectly arranged for and equipped, &c., &c., &c.; and that too supposing that complete equipment for the battalion (clothing, saddlery, arms, accoutrements, &c.) are all lying ready at the depôt. Otherwise chaos is the word. It is very true that a very great deal may be made out of chaotic elements. Were it not so the mounted infantry in Upper Burma, and probably also in Egypt, Soudan and South Africa, would never have done the good work that they have. Necessity is the mother of invention. The needs of mounted infantry are many, and the improvisation of them is a great field for ingenuity. In the Regulations for Mounted Infantry, p. 33, we read: "It often occurs that mounted infantry have to be improvised during a campaign, when many of the special articles mentioned above cannot be obtained." The word "often" should, as far as the past goes, be altered to "always."

What a battalion of mounted infantry composed of detachments from twenty or more different regiments would be may be confidently foretold from the experiences gained from the amalgamated companies of the Upper Burmese campaign. Granted that the battalions would be all British or all Native, and that the detachments would be composed solely of well-trained men (which is improbable), I maintain that a battalion made up of so many diverse elements, with all the distinctions born of different regimental prejudices, ideas and influences, would be less efficient and less well-disciplined than a battalion on a permanent footing. The Native soldier especially declines to blend. Detachments from one Native corps cannot see why they should obey the Native or non-commissioned officers of another corps. The several detachments do not blend. Much of course may be effected by rigorous discipline; but it is unsatisfactory. I look on the position of the commanding officer of such a corps as one not to be envied.

I propose the following war establishment of battalions and companies of British and Native mounted infantry in India :—

BRITISH MOUNTED INFANTRY.

Battalion.

Officers ...	1 Lieut.-Colonel.	1 Paymaster.
	2 Majors.	1 Quarter-Master.
	6 Captains.	1 Surgeon.
	12 Lieutenants.	1 Veterinary Surgeon.
	1 Adjutant.	

Warrant Officer	...	1 Sergeant-Major.
* *Staff-Sergeants*	...	1 Orderly-room Sergeant. 1 Quarter Master Sergeant. 1 Paymaster Sergeant. 2 Sergeant Farriers.
Non-commissioned Officers and Buglers	...	6 Company Sergeants-Major. 18 Sergeants. 24 Corporals. 8 Buglers.
Rank and File	...	512 Privates. 8 Farriers. 12 Shoeing Smiths. 12 Saddlers.

COMPANY.

One Captain, 2 Lieutenants, 1 Company Sergeant-Major, 3 Sergeants, 4 Corporals, 1 Bugler, 85 Privates, 1 Farrier, 2 Shoeing Smiths and 2 Saddlers.

NATIVE MOUNTED INFANTRY.

BATTALION.

British Officers	...	1 Commandant. 2 Wing Commanders.† 6 Company Commanders. 1 Adjutant and Paymaster. 1 Quarter Master. 1 Surgeon.
Native Officers	...	6 Subadars (1 Subadar-Major). 6 Jemaders (1 Jemadar-Adjutant).
Staff Havildars	...	1 Havildar-Major. 1 Quarter Master Havildar. 6 Havildars Riding Instructors. ‡
Non-commissioned Officers and Buglers	...	6 Pay-Havildars. 24 Havildars. 24 Naiks. 8 Buglers. 2 Farrier-Majors.
Rank and File	...	510 Privates. 8 Farriers. 12 Saddlers (Mochis). 6 Shoeing Smiths (Nalbunds).

COMPANY.

One Company Commander (Captain or Lieutenant), 1 Subadar, 1 Jemadar, 1 Pay-Havildar, 4 Havildars, 5 Naiks, 1 Bugler, 85 Privates, 1 Farrier, 2 Saddlers, 1 Shoeing Smith.

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* In peace time six Sergeant Riding Instructors may be added.
† Or three Double Company Commanders.
‡ In war time to remain at the depôt.

In time of war the number of British and Native commissioned officers can, if necessary, be augmented from the depôt battalion.

Now that the regulations for mounted infantry have been published it is unnecessary to say much about drill, dress, equipment, stable management, &c., in mounted infantry. A few remarks from personal experience may, however, be made.

The most difficult thing to teach mounted infantry men is to husband their steed's strength on the march and to take adequate care of it in camp or in the stables. In a regularly-trained corps, however, this should not be so.

Whether mounted infantry should be armed with a rifle or carbine depends on the nature of the enemy and of the country to be operated in. In Upper Burma carbines were sadly wanted. The heavy Snider rifle was a great encumbrance and drawback to the Natives. Against any European enemy and in open country, where long-range firing is possible, a rifle should be carried.

I think an improved form of sword-bayonet, more adapted for use as a cutting weapon, should be devised for mounted infantry.

Saddles of the pattern used by mounted officers of infantry, with wallets, panels, saddle bags, &c., should be supplied. A mounted infantry man ought to be so equipped that he can carry kit and food enough for himself and grain for his horse for several days. Bad saddlery will ruin the efficiency of any mounted infantry.

In Oriental countries, especially in the hot weather and in countries where rain is not excessive, mounted infantry are especially useful. The British soldier cannot do long marches in great heat, and even the Native soldier has to succumb occasionally. But mounted on ponies both arrive at the scene of action comparatively fresh.

The error of raising bodies of mounted infantry at a moment's notice must surely be patent to all. It simply means bad equipment, bad saddlery, and perhaps bad arms and bad mounts. When to these are added men untrained to the work surely we must wonder that a machine so full of imperfections should have turned out such good work.

A battalion of mounted infantry should have its own mule transport complete; and care must be taken that the saddles fit the mules. A Burmese pony was simply lost in the Regulation Ordnance Pack-saddle.

The training of mounted infantry is fully detailed in the Regulations. I would suggest, however, that mounted infantry be practised in manœuvring with cavalry and horse and field artillery.

CAVALRY *v.* MOUNTED INFANTRY.

By Lieut. W. W. Norman, *2nd Punjab Cavalry.*

Having read with very great interest the paper on Mounted Infantry, written by Major Hutton, King's Royal Rifles, in Vol. XXX, No. CXXXV, of the Journal of the Royal United Service Institution, I venture, as a cavalry officer, to express my opinion on the formation of corps of mounted infantry, from a cavalry point of view. Should it ever be decided to form corps of mounted infantry, they will, I feel sure, be formed and used to the very great detriment of cavalry, which I am convinced is capable of performing all that is expected from these hybrid corps. I may go further and say that, whereas the experiences of the last campaigns in Europe and the American War of Secession have not shown the necessity of raising a mobile infantry mounted on ponies, this being amply proved by the fact that neither Germany, Russia or France, have thought fit to raise such corps, yet it has, on the contrary, been most clearly proved that cavalry are able to fight on foot as well as on horseback, that if the object cannot be gained by the *arme blanche* then cavalry must attain it by the use of their carbines.

Major Hutton lays down three points, which he claims would be fulfilled by the creation of corps of mounted infantry. Taking each of these separately we find the first to be—

"*To provide an improvised substitute for an expensive cavalry in small and hastily-organised expeditions.*"

To answer this point it is necessary to clearly understand what the word "substitute" means. Are we to take it to mean that cavalry are to be literally put aside and their places taken by infantry? Can Major Hutton possibly mean that cavalry, being an expensive arm, it is advisable not to use it, not to expose our carefully trained troopers to the risks of being killed? It would indeed be a strange policy and quite at variance with British ideas to expensively equip and train a body of men for the express purpose of playing a particular *rôle* in warfare, and then when hostilities commence to shun sending them forth to do their own work and so gain the experience that is their due. I am inclined, however, to think that Major Hutton cannot mean "substitute" in its literal sense, but that he means "auxiliary." It, however, cannot surely be that he considers our proportion of cavalry so small that we have not enough for one of our small expeditions. Surely, if England cannot, then India could supply cavalry sufficient for an expedition to any place in Africa, which is to a great extent our theatre of small expeditions. It cannot be said that it would have been too great a strain on our resources to have supplied to an army in Egypt one more British and two more Native cavalry regiments. That mounted infantry have, wherever employed, been successful, it

cannot be denied; but we must bear in mind that they have never yet had to fight against cavalry, so the experiment has not yet been really tested. The success of the Boers, who were, to a grent extent, simply mounted infantry, lies in the fact that we had not a sufficient number of cavalry to act against them. Had more cavalry been employed, the tale of our reverses might never have been told.

I quote the following from Major Hutton's paper :—

"Our German critics ask cynically: Why do you create a hybrid of "hasty and therefore doubtful organization when you have already "cavalry and infantry? Why make infantry do cavalry work? To "which queries we, with the experience of small wars conducted at 5,000 "and 7,000 miles away from England, reply that our army being "so small the men composing it must be prepared to perform duties "of a varied nature as emergencies demand. In North America we "have to march in snow-shoes or portage boats; in South Africa we "must swim rivers, drive ox-wagons and ride half-broken horses; in "India and in Egypt we have to march over trackless deserts under "the fierce rays of a tropical sun, to ride camels and to row and portage "boats up well-nigh impracticable cataracts."

Now can we take this as an answer to the cynical German critic? The question asked is: "Why make infantry do cavalry work?" Has Major Hutton answered this? We can emphatically say, no. He has simply enumerated the various duties a British soldier is called upon to perform, and the British soldier in Major Hutton's eyes is apparently simply the infantry soldier to whose lot fall all the above enumerated toils and dangers. Can the cavalry trooper not claim to be considered a British soldier, and asked to be allowed to take his share of the various duties incident in our small expeditions? Any duty entailing the mounting of a soldier on a horse, galloway or pony, belongs essentially to cavalry. Riding half-broken horses or ponies, rushing camps, capturing dacoits, scouting, etc., are not duties within the province of infantry. Until it can satisfactorily be proved that an infantry soldier can ride a half-broken pony better than a cavalry man, and that he can better perform the duties of the reconnoitring veil, or that cavalry have proved themselves unable to fight on foot, then we must most certainly consider that the question, "why make infantry do cavalry work?" remains unanswered.

Turning now to the second point—"To provide for a campaign on a large scale an efficient auxiliary to our cavalry."

To show the necessity for forming this auxiliary, Major Hutton points out how deficient in cavalry a British army of 60,000 men would have been had it been necessary in the spring of 1885 to have sent one to Asia Minor. Allowing it to be the case that we could not have sent out a proper proportion of cavalry, it cannot be allowed that we would have had an excess of infantry, from which to form this auxiliary. It must be borne in mind that Russia will not mind how many troops she sends to be slaughtered; she might not at a time, owing to the want of supplies, be able to put more troops in the field than we could; but here the difference ends, for while she could

with care replace an army of 60,000 men at least five times, we could barely do so once. The cry with us would not be, "infantry are in excess;" it would much more likely be, "send us more battalions." It is utterly useless to imagine that, for a campaign against any Continental power, England could call on her infantry to supply an auxiliary to her cavalry. That our cavalry should be increased there can be little doubt, but any such increase must take the form of a corps, which shall be part and parcel of the cavalry arm itself. A very inexpensive method of adding to the strength of cavalry would be to attach a dismounted squadron to each regiment. On the outbreak of hostilities these squadrons could be embodied and formed into new regiments, which it might be necessary to mount on galloways or ponies.

I quote the following extract from Colonel Home's précis of Modern Tactics, which it would be advisable that advocates of mounted infantry should lay to heart:—

"However desirable it is that officers should know more than their "own branch of the service, and should understand the nature and "action of other arms, yet it is a mischievous error for any arm of the "service to seek to undertake the duties of others."

The third point is—"To provide a force of selected infantry sufficiently mobile to act as such in conjunction with cavalry."

Major Hutton here quotes Jomini on the advantage of having several battalions of mounted infantry. I will quote the same para. in full, from which it will be seen that Jomini is very careful to express no opinion which could be laid down as an axiom. On the contrary, the whole paragraph clearly points to the fact that it is possible to make cavalry fight as well on foot as when mounted, and though on the one hand he points out that the French cavalry were not a success when employed dismounted, yet he very emphatically states that the Turkish cavalry were able to fight as well dismounted as mounted. The paragraph is so full of interest that I quote it in full:—

"Opinions will be always divided as to those amphibious animals "called dragoons. It is certainly an advantage to have several "battalions of mounted infantry who can anticipate an enemy at a "defile, defend it in retreat, or scour a wood; but to make cavalry "out of foot soldiers or a soldier who is equally good on horse or on "foot is very difficult. This might have been supposed settled by the "fate of the French Dragoons when fighting on foot, had it not been "seen that the Turkish cavalry fought quite as well dismounted as "mounted. It has been said that the greatest inconvenience resulting "from the use of dragoons consists in the fact of being obliged at one "moment to make them believe infantry squares cannot resist their "charges, and the next moment that a foot soldier armed with his "musket is superior to any horseman in the world. This argument has "more plausibility than real force; for, instead of attempting to make "men believe such contradictory statements, it would be much more "reasonable to tell them that, if brave cavalry may break a square, brave "foot soldiers may resist such a charge; that victory does not always "depend on the superiority of the arm, but upon a thousand other things;

"that the courage of the troops, the presence of mind of the com-
"manders, the opportuneness of manœuvres, the effect of artillery and
"musketry fire, rain, mud, even have been the causes of repulses or of
"victories; and finally that a brave man, whether on foot or mounted, will
"always be more than a match for a coward. By impressing these
"truths upon dragoons they will believe themselves superior to their
"adversaries, whether they fight on foot or on horseback. This is the
"case with the Turks and the Circassians, whose cavalry often dismount
"to fight on foot in a wood or behind a cover, musket in hand, like
"foot soldiers."

Again Major Hutton quotes General Rosser of the American Army, who, after the conclusion of the American War of Secession, stated:—

"The cavalry soldier should never be dismounted to fight if you
"expect him to ride over masses of infantry, and he should be educated
"to believe that nothing can withstand a well-executed charge of
"cavalry."

Now was this the experience of the American War? Does not the very last fight in that terrible campaign incontrovertibly refute this? I refer to the Battle of Five Forks near Dinwidie, the most glorious example of cavalry acting dismounted. Besides this there are many other examples in which cavalry successfully maintained a combat with their fire arms.

I find I must, at the risk of being considered tedious, quote one more extract from Major Hutton's lecture. It is as follows:—

"I venture to submit that as a certain proportion of artillery is
"considered indispensable for the effective support of cavalry, so also
"is a proportion of carefully selected and mobile infantry necessary. The
"enormous power and increase of range in infantry fire must necessitate
"the employment of infantry to protect and cover the movement of
"cavalry from an enemy's infantry; and I feel sure that such will be
"found the case in the next campaign between civilized powers.
"The great concensus of opinion points to the fact that cavalry cannot be
"used effectively as infantry."

We can form no opinion of what will occur in future campaigns, unless that opinion be based on the experiences of past campaigns. It would be hazardous to create a new arm which has only been tested against undisciplined and savage troops, and which has not passed the grand test of having been opposed to cavalry. The experiences of 1866, 1870, 1871 have not taught the victors or the vanquished that there is any necessity of forming a mobile infantry, such as Major Hutton proposes. That great strides have been made in the increase of range and accuracy of firearms is well known, but surely cavalry has also a claim on the inventions of science, and may ask to be supplied with a firearm which will render it independent of an infantry support. The employment of infantry to protect and cover the movements of cavalry would be a most unwise and foolish act. It would have the effect of utterly demoralizing cavalry if they were taught to imagine that they needed protection. A cavalry man should be taught that his first weapon is the sabre, and that if he is ordered

to attack infantry or artillery he must endeavour to do so mounted, but that failing this he must attain his object by dismounted action, relying then on his carbine and not on the infantry soldiers' rifle. That the great concensus of opinion does not point to the fact that cavalry cannot be used effectively as infantry is but shown from the following extracts from the German Instructions for Cavalry by Major General Von Schmidt :—

"But the experiences of the last campaign have proved irrefutably "that it is indispensably necessary that cavalry should to a certain extent "be able to fight on foot, if it would be prepared to fulfil all the tasks "which, without demanding too much from it, will in certain situations "fall to its lot in the field.

"It cannot too often be repeated that the main thing is to carry out "the mission in hand at any price, if possible. This should be done mount- "ed and with the *arme blanche* ; but should that not be feasible, then "we must dismount and force a road with the carbine.

"I am convinced that cavalry would not be up to the requirements "of the day if we were not able, under certain circumstances, to fight "on foot, nor would it be worth the sacrifices that it costs the State. "Independent and successful action of cavalry divisions is not con- "ceivable unless such cavalry is capable of maintaining a combat with "firearms, offensive and defensive, by whole regiments either for the "attack of localities or for the defence of their cantonments.

"The drill regulations of Frederick the Great for his cavalry required "not only that they should be capable of holding positions and villages "against an enemy, but that they should be able to attack and master "such places as churchyards, etc."

Corps of Mounted Infantry are organized for the following purposes :—

(1) To provide an auxiliary to our expensive cavalry.

(2) Being more mobile than infantry to seize and hold temporarily advanced or important points until the arrival of infantry.

(3) To act in country where cavalry mounted on big horses cannot act.

I propose to show that cavalry with but slight alterations in its present system of organization, equipment and armament is capable of fulfilling all the abovementioned points. I must here take the opportunity to state that my suggestions apply primarily to native cavalry, that being the arm of the service to which I have the honor to belong.

(1) *To provide an auxiliary to our expensive cavalry.*

With regard to this point I would urge that since any such auxiliary must be part and parcel of the cavalry arm itself, every regiment should during peace have a proportion of dismounted men included in its strengths. This proportion should consist of an extra squadron, but for reasons stated further on I am afraid I must limit myself to saying an extra troop. The men forming this dismounted troop would of course be on a reduced rate of pay. Vacancies in the mounted squadrons would be filled by men from the dismounted troop,

the training of which would in no wise differ from that of the rest of the regiment. Arrangements would be made regimentally for the instruction in riding of this troop. All first enlistments would be made into it. The men should be taught to know that only the very best soldier would get a mounted vacancy, seniority in the dismounted troop being no claim whatever. It should also be laid down that no man, who had not for two years previously qualified as a first class shot, should get a mounted vacancy when it occurred.

The dismounted troop would be for all purposes of instruction and interior economy under the adjutant. To defray the extra expenditure that the State would be put to in raising this dismounted troop, I would advocate a change in the system of grass-cutters.

This system, as it now stands, consists of one grass-cutter and pony to every two sowars. The pay of a grass-cutter is Rs. 6 per month, his employers paying Rs. 3 each. In a native cavalry regiment on the present establishment of 576 sowars there are 283 grass-cutters, who at Rs. 6 each cost the State or the sowar—it matters little which—the monthly sum of Rs. 1,698. The pay of each sowar should be reduced by Rs. 3 a month, that being the sum he receives from the State for transmission to the pocket of his grass-cutter. The pay of a sowar being reduced by Rs. 3 per month the State should take on to itself the payment of the grass-cutters, and, instead of allowing one grass-cutter to each pony, reduce the number by half and make each syce or grass-cutter attend two ponies. By thus taking their payment into its own hands, and reducing the number of grass-cutters to half the present establishment, the State would make a saving of the pay in round numbers of 140 grass-cutters, *i.e.*, of Rs. 840 per month, which would go a long way to the cost of defraying the expenses of the dismounted troop. The grass-cutters, who would now receive their pay direct from the State, would be placed on the same footing as transport drivers.

Ponies would be supplied by sowars as is done now at their own expense; they would, however, be kept in separate lines and be under the charge of the transport officer. A couple of old sowars per troop might be told off to look after the ponies of their troops in the same manner that the darogha looks after the horses. A monthly deduction from the pay of each sowar would be made for cost of ponies' feed, etc. With proper regimental arrangements there should be no decrease in the supply of grass, and with castrated ponies no difficulty should arise in their management when used to transport baggage, etc.

This plan would not only, as I say, help very materially towards defraying the cost of the extra troop, but would reduce the number of camp followers, a very serious question in itself. And to those who cling to old traditions I would point out that the recent order for the castration of ponies can only mean that at some future date, perhaps, the campaign will see the issue of a fresh order ordering perhaps a very much greater reduction in the number of grass-cutters than I have suggested. Let us then try and see if we cannot keep the money now expended in the grass-cutters' wages in the regiment and

turn it to account in increasing our efficiency. I may add that the sowar would not be a loser as the money would go indirectly to his pocket; his sons and brothers could be enlisted at once instead of hanging on as ommedwars.

The pay and establishment of the dismounted troop would be as follows :—

No.	Establishment.	Rate.			Amount.		
1	Jemadar, mounted	60	0	0	60	0	0
1	Kote Duffadar, mounted	47	0	0	47	0	0
6	Duffadars, mounted	38	0	0	228	0	0
1	Pay Sowar, mounted	33	0	0	33	0	0
70	Sowars, dismounted	8	0	0	560	0	0
2	Farriers only in time of war	27	0	0	0	0	0
	TOTAL Rs. ...	...	...	...	928	0	0

The jemadar would be an assistant to the woordi-major and should be an especially selected native officer; he should have been through a six-months' course of instruction with a British cavalry regiment. In the same manner all the duffadars should also be passed instructors.

The benefits arising from this addition of a dismounted troop to each regiment individually and to the State would be as follows :—

(1) The dismounted troop would be a training school, from which vacancies in the mounted ranks would be filled up; the men composing it being longer under instruction would be better fitted to take their places on a vacancy occurring in the mounted squadrons.

(2) On a regiment being ordered on service the dismounted troop would form the depôt, and all actual vacancies would be filled up to enable the regiment to march out with its full complement. Men in hospital, old sowars unfit for further service and others might be transferred to the dismounted troop, the new promotions taking over their horses, accoutrements, etc.

(3) Without incurring much extra expenditure the State would have at its disposal on the outbreak of hostilities a body of men ready trained and available, not only as a reserve to fill up casualties, but should it so wish could collect these dismounted troops and form them into new regiments of cavalry, or mounting them on ponies raise light bodies of men to act in a great measure dismounted.

To recapitulate I hope I have shown that without much extra expense, albeit with perhaps some extra trouble in the question of grass supply, the State would provide itself with a very efficient auxiliary to its cavalry. Among the 26 regiments of native cavalry on the Bengal establishment the addition of a dismounted troop would mean the addition of 1,975 ready trained men. If this system was extended to British and Native cavalry alike to the extent of a dismounted squadron, the State would have at its disposal a force of close on 10,000 men, which on declaration of war it would only have to provide with horses or ponies as most suited to the exigencies of the campaign and to the country in which called on to operate. I have, however, only proposed it to be applied to regiments of native cavalry, and to the very limited extent of one troop per regiment, as having urged the adoption of the system it becomes my duty to show in what way the State would be able to meet the extra expenditure without increasing the budget, and with my extremely limited knowledge of military expenditure I am unable to put forward a scheme of any greater magnitude.

(2) *Being more mobile than infantry to seize and hold temporarily advanced and important points until the arrival of infantry.*

Owing to the increased range and accuracy of firearms it is now considered by many to be impossible for cavalry to take its old place in line of battle. But, because it may not perhaps be now able to perform the dashing charges of old, none the less is its presence in a campaign, and even on the field of battle itself, as a fighting factor as necessary as it ever has been. The days of cavalry are not passed; there is still a glorious future before it—a future born of the American War, which showed the world what cavalry could do by being the eyes, ears, feelers and impenetrable veil of an army, to witness Stonewall Jackson's campaign in the Shenandoah Valley, where with a force amounting to 13,000 men he successively defeated Milroy, Banks, Fremont and Shields, whose forces aggregated 64,000 men. During the 35 days that this campaign lasted his army marched a total distance of 245 miles. The fruit of this campaign was the repulse of McClellan's army on the Chickahominy. No one will gainsay that these tremendous successes were due in great part to Ashby's force of 1,000 cavalry, who, during those 35 eventful days, seemed ubiquitous.

Again in a perfectly different fashion, opening out for itself a new line altogether, it showed that even on the battle field itself it was still able to maintain its place. Wilson and Sheridan were the demonstrators.* The former with a force of 12,000 cavalry was ordered to destroy the military resources of Alabama. The expedition was to last 60 days. Each trooper took with him five days' ration and 24lbs of grain, a pair of extra horse shoes and 100 rounds of ammunition. There was also a pontoon train; additional supplies were carried in wagons. The troops were armed with the Spencer carbine. With this force Wilson made a raid from Eastport (Miss.) to Macon (Ga.) burning stores, bridges,

* See Draper's History of the American War.

foundries, etc., *en route*. Selma, which was strongly fortified and garrisoned with about 7,000 troops, he carried by assault, April 2nd, capturing 32 guns and 2,700 prisoners. On April 12th, Montgomery surrendered; here Wilson destroyed 5 steam boats, several locomotives, an armoury and several foundries. Entering Georgia he captured Columbus, taking 52 guns and 1,200 prisoners. A confederate ram, carrying six 7-inch guns, was destroyed with the navy yard, arsenal, factories, etc. On the 20th Macon surrendered.

During the campaign on the Appomatox, when Lee turned to bay at Five Forks and drove Sheridan back towards Dinwidie, the latter dismounted his cavalry at Chamberlain's Creek, and deploying them on foot held Lee in check until the arrival of the 5th infantry corps, when the enemy, fearing that their retreat might be cut off, abandoned their position in front of Sheridan. In this action the infantry took no part whatever. The next day the same cavalry, who had fought so well the day before on foot, performed many gallant charges, conclusively proving that a trooper does not lose faith in his sabre from the fact of using his carbine dismounted. The immediate effects of this battle at Five Forks was the surrender of General Lee at Appomatox Court House a few days after and the consequent termination of the Civil War. To cavalry acting dismounted was their success due.

My aim in giving these examples has been to show that cavalry acting dismounted are able to achieve very great and important results on the field of battle; and, if this point be conceded, then I ask why should a force be raised more mobile than infantry; in what would its mobility consist? The answer is Major Hutton's, "the increased power of locomotion which a horse, pony, mule or camel may give him." We have cavalry already possessing this mobility; what is wanted in addition is the power to seize and hold important points until the arrival of infantry. This is gained by the possession of a good firearm, by a knowledge of its use, and by an extended system of dismounted drill. There can be no doubt but that many cavalry officers—I am afraid I must say the majority—are averse to dismounted work. But let them beware how, in giving way to what is nothing but pure sentiment, they pave the way for a total abolition of their arm. Once let the idea take firm root that cavalry dismounted cannot obtain as great and important results as hybrid corps of mounted infantry, it is not much to suppose that it will ere long be claimed that infantry mounted on ponies can replace them to a very great extent. In fact this is no alarmist's cry as the following extract from Major Hutton's paper shows:—

"Two or three battalions of picked infantry mounted on Syrian "or Karamanian ponies would be able to relieve cavalry of many of "their most trying and irksome duties, such as vedette and outpost "work, orderly duty and escort."

This is the thin edge of the wedge, and it behoves cavalry men to see that it is extracted before we see ourselves supplanted on the battle field, and in the reconnoitring veil, by mounted infantry.

The possession of a good firearm is an imperative necessity. A long rifle accurate up to 1,200 or 1,500 yards is not wanted ; besides it has the damning defect of not being able to be carried in a bucket or slung over the back. A short firearm with adjustable magazine, which will shoot true up to 800 or 1,000 yards, is all that is wanted, as the dismounted tactics of cavalry would be to get within that range as soon as possible. The advantage gained by mobility would be rendered useless if a desultory fire was kept up at long ranges. Besides the ordinary occasions, such as those laid down in Sec. 22, Part II, Cavalry Regulations, cavalry might with advantage be used to suddenly prolong a flank or in turn hurl themselves on the enemy's flank. If it is true that we are to be armed soon with the Lee-Warner carbine nothing more is to be said ; but failing this let us have the Martini-Henry, and I undertake to say that we can do anything capable of being done or that has been done by mounted infantry, either in Egypt or Burmah.

(3) "*To act in a country where cavalry mounted on big horses cannot act.*" Both in Egypt and Burmah corps of mounted infantry were formed composed of detachments from different regiments. I presume therefore that the system of taking detachments from different regiments can have no objection. I would propose then that, should at any future date a body of men mounted on ponies be required to act in a country like Burmah, selected regiments should be called on to furnish a certain number of marksmen and first-class shots. There should be no trouble as to the taking care of the horses of men ordered away on detachment. There are always plenty of casters in a regiment which the Remount Committee are unable to provide for ; these should all be sold and the vacancies filled up by the horses left behind by the detachment. Further, should it be found that after filling up all such vacancies a surplus of horses remained, the balance might be distributed amongst other regiments at a valuation. A few spare horses, however, would be an advantage to spare remounts not of an age being worked hard. The next difficulty is to consider the supply of remounts to the detachments on rejoining from the scene of operations. To obviate any such difficulty I would recommend them being obtained from rearing farms on the principle suggested by Mr. Pringle, A.V.D. There are a very many old native officers who, for a very small pecuniary remuneration, would look after a small rearing farm near their homes.

If the scheme of a dismounted troop per regiment were in force, the difficulty as to taking care of the horses of the men ordered away on detachment would be simply *nil*.

Conceding that arrangements could be made for the care of the horses and where there's a will there's a way, it surely would be a far more sensible plan to take detachments from cavalry, and not from infantry ; there would then be no hurried training ; the men would come ready trained, ready to fall into their places, and there would be then none of that "irregular helter-sketer method of manœuvring'" which Major Hutton complains of as being most difficult to combat in corps of mounted infantry in Egypt.

Mounted infantry are a gross infringement of the rights of cavalry, and it boots cavalry men to look seriously to this. We are the only true mounted arm ; we possess mobility, the power of attacking, dismounted as well as mounted. With reference to this latter point, and as a great conclusive proof that I am right in maintaining that cavalry can do all that is expected from mounted infantry, the fact stands out that mounted infantry have removed themselves from the category of infantry and aspired to be light cavalry by using dahs in Burmah and assegais in Zululand. The instinct of the horseman was bound to turn to the *arme blanche*. The advocates of mounted infantry are at variance amongst themselves as to whether a weapon for defence while mounted should be carried ; but depend on it, whether it be sabre, assegai or dah, somehow it will find its way into the hands of the mounted infantry man. If so, what is he then but a cavalry man mounted on a pony for the time acting the *rôle* of an infantry man.

Mobility, being the rapid power of locomotion given to a man by his horse or pony, necessarily means that the horse or pony is able to carry the man about rapidly ; to be able to do this the horse or pony must be in good condition and well cared for. The knowledge to attain this cannot be expected from an infantry man. No mounted corps can possess mobility if the majority of the horses or ponies have sore backs. When a body of men take the field they are expected to come ready trained after long and careful preparation during peace. When, therefore, a body of light active troops, mounted on ponies, are next required to act in a country like Burmah or Egypt to rush camps, to capture dacoits, etc., I would suggest that detachments be taken from British and Native cavalry and not from infantry, and it surely is not too much for us to ask to do our own work.

Major Hutton draws a truly ludicrous picture of the dismounted dragoon or hussar struggling with clanking sword, or jingling spur, and there can be no doubt but that what he says is to a very great extent true. It is impossible to expect men in long boots to work effectively even over the best ground for any length of time. Long boots should be dispensed with and putties be worn in their stead.

The great difficulty a sowar has to combat when dismounted is to prevent his sword tripping him over, and all the time he is dismounted he has to keep one hand steadying the scabbard, for it is a fallacy to imagine that hooking up the sword obviates this liability to be suddenly thrown down, as even then it manages to work itself between the legs, and is continually slipping out of the hook. It is with no wish to foist one more gym on to the sowar, but with a sincere belief that the equipment I advocate would enable him to fight as free on foot as the infantry man, would enable him to hold his own against the bayonet while fighting dismounted, either in the plain or in a defile, up or down rocks or over boulders. Major Hutton says that the carbine and sword are no match for the rifle and bayonet ; this may be true as demonstrated

at an assault-of-arms, but it is a different thing working the bayonet when the barrel is almost red hot, and unfortunately it has been proved that the assegai in the hands of an Arab or Zulu is a match for the rifle and bayonet, as also the sword in the hands of a determined Afghan.

I append a few sketches showing the method of carrying the carbine slung, wearing the sword dismounted and carrying ammunition.

Carrying the carbine.

In Fig. 1 it will be seen that I attach a sling on to the side of the stock instead of in the usual way. For this I claim that the carbine sits much easier and firmer on the back. The two swivels should not be screwed into the stock but should be made so as to revolve. The sling itself is in two pieces; each piece has about 1½ inches from its lower end a brass stud on the inside; the projecting end is then passed through the swivel and fixed on to the stud in the same manner that sword slings are attached to the rings on the scabbard. The lower half of the sling has a buckle attached to its upper end, while the upper half, *i.e.*, that piece attached to the lower band, has a thick piece of leather sewn on to the upper end; this piece of leather is not so thick as to prevent the upper half passing through the buckle, but effectually prevents it slipping back accidentally. When not in use the sling can be detached. On the command sling carbines, the carbine is taken out of the bucket with the right hand; the left hand drops the reins for one short moment and grasps the muzzle of the carbine with the back of the hand towards the body; the right hand then takes hold of the end of that half of the sling which passes through the buckle, and as the left hand carries the carbine over the left shoulder the sling is pulled tight. This being done the left hand grasps the stock and presses it towards the left so as to make the muzzle point as straight over the left shoulder as possible; meanwhile the right hand fixes the steadying strap (shown in Fig. 3). I have myself tested carrying the carbine in this way, and though I found it no inconvenience under any circumstances, I am bound to say that out of four sowars, who for a few days wore a carbine attached in this manner on parade, two declared that it hurt their backs, while two found no inconvenience. The reason is not far to seek; it lies in the difference of flat and round shoulders, and as we have not all flat shoulders, I would propose a diamond-shape piece of padding to be sewn inside the back of the coat about the place, where the trigger guard and lock would come.

The carbine should be slung over the left shoulder for the reason that it would then act as a shield on that side on which the sowar is most unable to defend himself; again, if worn over the right shoulder, the sowar is unable to come to the "Assault," and therefore unable to use his sword properly, unless, however, the carbine be slung so low as to bring the end of the muzzle below the point of the shoulder; if this be done then the stock is very inconvenient when riding knee to knee in the ranks.

If, however, the carbine be slung over the left shoulder a pouch belt cannot be worn, but surely it would not be a very great sacrifice to do away with this apparatus as an ammunition-carrying article. The pouch

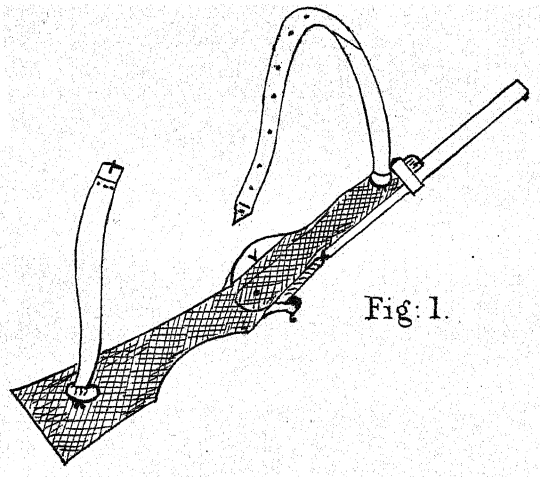


Fig: 1.



Fig: 2



Fig: 3.



Fig: 4

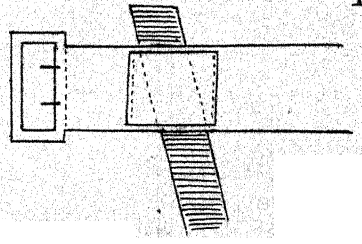


Fig: 5.

belt is very inconvenient to men acting dismounted, for, when suddenly lying down or getting up, cartridges are apt to fall out, and to obviate this sowars are wont to carry cartridges in their breeches pockets. If they find this is more convenient, it is our place to help them and do away with the pouch belt.

Method of carrying ammunition.

In Fig. 2 a small pouch marked "A" will be seen attached to the belt on the left hand side; this pouch should be made to hold ten rounds, which are quite sufficient for all practical purposes during peace; perhaps a more convenient way would be to carry the ten rounds in the bandolier fashion—five rounds on the right and five rounds on the left of the belt buckle.

For use on service a brown canvas waterproof bag capable of holding five packets of ten rounds each should be worn on the right side, the strap passing over the left shoulder and under the belt to keep the bag steady; to relieve the sowar of the weight of these fifty rounds the cartridges should, when the sowar is mounted, be carried in the holsters, and only taken out and placed in the bag when it was considered necessary to sling carbines.

Method of wearing the sword dismounted.

In Fig. 4 it will be seen that the sword is carried thrust between the belt and kummerband, but to keep it perfectly steady a small strip of leather should be sewn inside the belt, forming a frog, which would keep the sword firm. Fig. 5 shows this piece of leather. The sword worn in this fashion is no inconvenience whatever to a sowar when firing, sitting or lying down, and he is able to move over ground as easily as the infantry soldier. Should cavalry be called on to drive an enemy out of an enclosure, a wood, etc., at the point of the sword after having paved the way with their fire-arms, then the latter could be slung over the shoulder the same as when mounted to give freer play for swordsmanship.

In conclusion I hope it will not be considered too great presumption in one inexperienced in actual campaigning to have thus written on such an important subject. I have endeavoured to supply my want of practical knowledge by examples and quotations that none can gainsay. I do not wish for an instant to say that mounted infantry are useless; that they are not has been very thoroughly proved; but I claim that cavalry could have done the work as effectually, if not more so. During the Indian Mutiny General Olpherts, V.C., had a battery composed of men from the cavalry and infantry; they all wore their own uniforms, hussars, highlanders, etc., and General Olpherts says that if he had not had these men he could not have worked his battery. But examples like these are no precedent that one arm of the service should seek to do the duty of another arm. Among all the distinguished officers present at Major Hutton's lecture Major-General Sir Redvers Buller alone stood up as a champion for cavalry. The pith of all his criticisms lay in the following remark:—

"Now I cannot help thinking that in the English army we really "do a great deal of injury to our cavalry by the use we make of mounted

"infantry, for in the late small expeditions the cavalry has to a great "extent been kept away and have lost the experience that was their "share."

If we wish to start a system of rapidly transporting a body of infantry from one point to another on the battle-field, etc., why not let us on field days and during manœuvres see how the following plan would act :—

"Occasionally to gain time the Turks mounted some of their "infantry *en croupe* behind their spahis. Thus, early in the battle of "Ryminik, when they had to contend with Marshal Suwarrow and "some Austrians, a body of 6,000 Janissaries jumped up behind an "equal number of Turkish horsemen and were carried at full speed "to occupy a commanding eminence, of which the Austrians were also "desirous of taking possession.*"

If such a proceeding was successful once it should be successful again.

As in the old days a cavalry commander saw his opportunity in a shower of rain, which damped the priming of the old matchlocks, so in future will he again find innumerable opportunities to break up corps of mounted infantry if they are ever really used in a campaign. Only, a very small handful of men, such as a small patrol of 10 or 15 men would create simply havoc among the led ponies. In attacking mounted infantry it would not be from the squadrons actually charging from whom the duty of scattering the led horses would be expected; they would confine their attentions to the cavalry escort, while small bodies of men would hurl themselves through the intervals, and go straight for the led horses or ponies. Lastly, if cavalry is to be called on to perform the new duty of protecting the led horses of mounted infantry, it will be seen that it must be proportionately increased to enable it to perform this new duty. So in the end we shall come to the fact that mounted infantry have been raised to supplement cavalry, and cavalry increased to protect mounted infantry.

* Cavalry: Its history and tactics. By Capt. Nolan, 15th Hussars.

INFANTRY TACTICS.

By Captain G. H. Robinson, 1/1 *Goorkha L. I.*

Before deciding on a change in our infantry attack formation we should consider the *principles* arrived at in the several Continental armies which have had experience of modern warfare as affected by the fire of breech-loading rifles, and endeavour to adapt (not slavishly copy) them to the traditions and characteristics of our own army.

The Germans seem to have arrived at the following principles:—

1. That a direct attack to be successful must be made in several lines more or less extended, pushing forward at a quick step and gradually closing on the most advanced or firing line and carrying it forward with each successive reinforcement.

2. They lay great stress on discipline, especially fire discipline, in the fighting line. The advance of the several lines is made with the strictest attention to discipline, the bands playing and the colours flying, and the moral effect is supposed to be very great.

3. They hold that the admixture of not only companies but also of battalions and even larger bodies is unavoidable, and train their men to place themselves under the orders of the nearest officer without reference to the regiment in which he may be serving.

4. They do not believe that volley firing, except in the earliest stages of the attack, is possible.

As regards the Russian system:—

1. Skobeleff found that the only way of successfully attacking a position defended by breech-loaders was in several lines of skirmishers successively reinforcing the firing line and carrying it forward with a rush.

2. They are of opinion that volley firing is the more advantageous way of employing rifle fire.

3. They also hold that the days of bayonet attacks are not by any means ended, and their men are trained to always keep the bayonet fixed when manœuvring, even at the earliest stages of the attack.

The French are coming round to their old national characteristic of elan in the attack, but we do not hear much of their fire tactics.

The Austrians are said to pay great attention to cover in making an attack, and their advance is considered slow in the extreme.

The principal point of difference between the German and Russian systems is independent *vs.* volley firing. The Germans are a close-thinking practical race, and they are not likely to have adopted independent firing without very good reasons. On the other hand the Russians have had later experience, and, if they found that volley firing was practically possible in the late Russo-Turkish war, we

ought not lightly abandon its very obvious advantages. These advantages are :—

1. It is easier to maintain discipline.
2. It is easier to control the fire both as regards volume and direction.

The traditions of our own army, before the days of the present extended order formation, were towards the maintenance of a very strict discipline, resulting in a most remarkable steadiness in battle, which steadiness was the admiration alike of our friends and foes. Let us develop this traditional characteristic of our army by adopting such a formation as will enable our officers to maintain the same strict discipline in action which our forefathers did before us in the famous Peninsular days. Given perfect discipline in the field, the present arms of precision, and infantry well trained in collective firing, the most extraordinary results could, I firmly believe, be attained from well-directed rifle fire. In the old Brown Bess days the disciplined fire of infantry created great havoc, and far greater results could be attained by the present arms if only the same discipline were maintained. The disappointing results of breech-loading rifle fire in action are probably due to the fact that discipline has been greatly relaxed in the "dispersed order" of fighting, and too much attention has been given to developing a formation suitable to the *natural* inclination of the individual soldier rather than to the disciplined steadiness of the mass.

Then, again, we must consider the effect magazine rifles will have on the tactics of the future. To me it appears that it will tend to necessitate a far greater attention than ever to discipline in the fight, not only in order that a better control of fire may be obtained, but also that the men may be kept in hand at a time when they will be exposed to a withering fire, the density and effect of which can hardly be imagined. Further, it must be borne in mind, that our infantry does not consist solely of highly-trained British soldiers. Our next war will probably see a considerable number of native troops engaged, and also perhaps Colonial militia and volunteers, who, if strict discipline is not maintained, will very soon degenerate into a mob. A formation then appears necessary which will be suitable alike to the British soldier and the native, to the regular and the half-trained auxiliary, a formation in which discipline may again play the leading part.

The question then arises whether the present extended order formation is suitable for maintaining a rigid discipline in action. There is no burking the question ; it is not suitable. There is very great difficulty in getting orders carried out in even a sham fight. What will it be in action when the men and officers are being knocked over by the dozen at a time ? Some military writers have gone as far as to suggest a return to the old "thin red line," but they appear to have overlooked one great principle in modern infantry tactics, namely, that only as many men as can use their rifles efficiently should at first be employed in the fighting line ; all superfluous men become mere targets to be shot down. We must then look for a formation in the fighting line somewhere

between "the thin red line," standing two deep, and the present extended formation, allowing four paces per file. A single rank with elbow room, say one pace per rifle, at once suggests itself. In such a formation discipline could be maintained quite as easily as in the two deep formation, while every man would be able to use his rifle with effect, whether standing, kneeling or lying down, which is not the case when two deep, as in the latter only the front rank can use their rifles in the lying-down position. The single rank with a man for every pace of front will, of course, be more vulnerable than the extended line with only one man for every two paces, but the advantages gained in stiffness and discipline would, I submit, more than compensate for the extra vulnerability. It must also be remembered that such a line is twice as powerful for offensive action by reason of its having twice the number of effective rifles. Again, as this line would be fairly thick from the commencement, the early reinforcements would not always appear necessary, and thus the units would to some extent be kept intact.

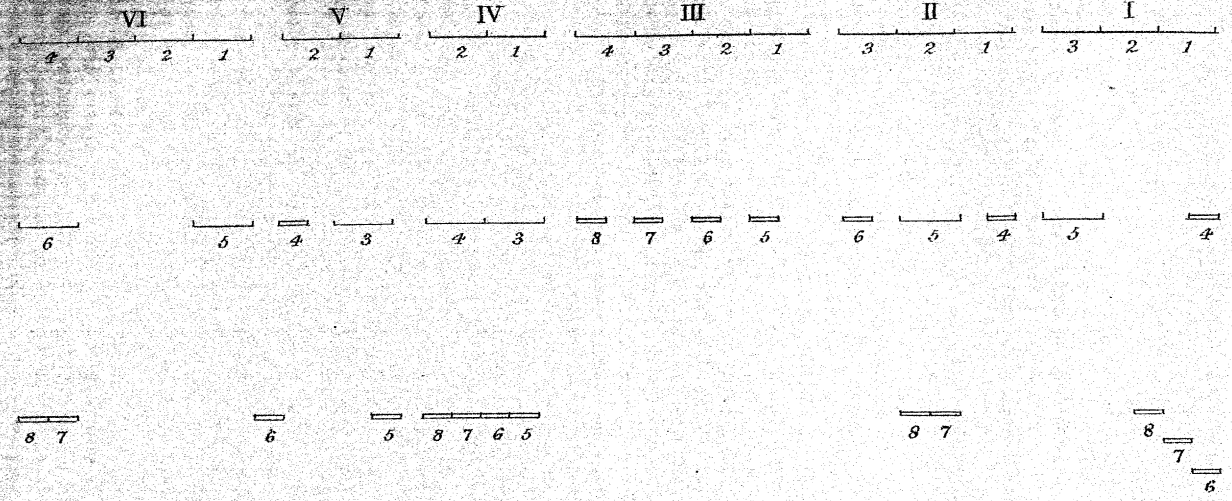
Again, with reference to fire discipline and the control of fire, it is generally admitted among British officers that volley firing is far and away superior to independent firing, and this opinion is borne out, as we have seen, by the Russians. We hold that a few rapid well-aimed volleys delivered at decisive ranges, such as the new magazine rifle will soon enable us to do, will have a far greater moral effect on the enemy than a greater number of rounds per rifle fired independently, because a greater number of men are struck down with one blow as it were and because fire discipline can be more easily maintained. But for efficient volley firing the "fire units" must be kept intact to the last; it is when *these* get mixed up that confusion takes place and wild firing commences, and this is exactly where the difficulty arises. Several systems of attack have been promulgated by officers whose aims have been to get rid of this difficulty, but they all seem wanting in practicability. All these officers endeavour to keep each unit, whether it be section, company or battalion, quite intact, and this is just what the Germans tell us is impossible. As has been already stated the Germans make up their minds to this admixture and train their men accordingly. Let us make up our minds to do the same and limit ourselves to preserving intact the "fire unit" only, which with us is the section varying from 8 to 25 men. But a section of 25 men is generally admitted to be too large for a "fire unit," and several writers have recently recommended that a company be "told off" into "groups" as well as into sections and half companies. The term "group," however, is applied in our drill to a "section of four." I would suggest therefore that, when a company has over, say, 30 files, it be "told off" into "half sections" as well as into sections and half companies. Thus strong companies of over 30 files would consist of eight and the weaker ones of four "fire units." These "fire units," whether sections or half sections, should be numbered off from right to left in the same way as the companies of a battalion, thus, "No. 1 fire unit," "No. 2 fire unit," &c. A single rank fighting line would then be divided into a number of fire units according to the number and strength of the companies

composing it, and the men of these "fire units" should be *drilled* to always feel inwards towards their centres, regardless of any gaps that may be created on their flanks. At drill, on field days and on every occasion when attack and defence is practised, men should be ordered to fall out and the remainder made to feel inwards instinctively. Officers and unit commanders should also be directed to fall out to represent casualties and the next seniors trained to readily assume the responsibilities of command. In this way gaps will gradually be made in the fighting line, and into these gaps the reinforcing "fire units" must insert themselves in *one body*, in single rank if possible, if not in two or more ranks, the object being to keep the units from mixing; opportunities will occur soon enough to admit of their opening out into single rank. In reinforcing, the principle should be observed that, although companies, battalions, or even brigades, become intermixed, the little knot of men forming a "fire unit" should be kept quite separate and intact until, through losses, they cease to exist. While on this subject of "fire units" I would suggest that the subaltern officers be relieved of duties of "guides" and "section commanders" as officers are not one too many for directing fire and maintaining discipline, while non-commissioned officers can, and do, perform the duties of "guides" and "section commanders" satisfactorily.

Again the words of command for volley firing might be greatly simplified. When practising firing rapid volleys it is difficult, and with some men impossible, to get out the long caution preceding the executive word "Ready." For instance "No. 1 section fire three volleys at four hundred and fifty yards" might be conveniently cut down to "First section, three volleys, four fifty," or just half the number of words for the nervous or indifferently trained "section commander" to stumble through. I have frequently seen a section commander quite half a minute getting through the caution, a length of time quite sufficient for him to miss a fleeting opportunity altogether. Then, with reference to the adjustment of the backsight, a single man fumbling with his backsight will frequently spoil the rapidity of the volleys of a whole section. I would suggest, therefore, that three volleys should be the rule and that the distance given should be estimated for the second volley; the first volley would then be fired at the head, the second at the middle, and the third at the feet, of an approaching object without altering the backsight. For firing at a retiring object it would be *vice versâ*, the words of command in either case being "high, present," "low, present" or simply "present," as the case may be.

With reference to the number of companies to be sent into the fighting line to start with I would suggest that this is a question for the commanding or other senior officer to decide on the spot. It is absurd to lay down any hard and fast rule to meet every conceivable case which would occur in actual warfare, but, as a general rule, entire companies should be employed in preference to portions of several with their remainders in support; thus the attentions of the captains would be confined to the object attacked, to directing fire and to maintaining discipline instead of being divided between front

DIAGRAM I.



Scale 1" = 200 Paces.

A Battalion = 8 Companies.

A Company = 50 Files.

and rear, as it is the case at present. As four companies formed in single rank, with one pace per rifle, would occupy the same front as *ten* companies formed two deep with only 24 inches per file, it follows that it would never be convenient to place more than half a battalion in the fighting line at first, the other half battalion following at 200 to 400 paces in rear in such formation as its commander might consider advisable; or, only two companies might form the fighting line, the remainder following in one or more lines at the above stated intervals, each line having its own commander. Then, when the fighting line became checked, the next line in rear would close on it and carry it forward at a steady run. A reference to diagram No. 1 will show at a glance different ways of forming battalions in the "first line" of an attack. Battalion I is formed in three lines on a front of three companies, *i.e.*, eight men to every three paces. Here three companies form the first, two the second and three the third line. Battalion II is also formed with the same front and depth, but three companies are in the second and only two in the third line. Battalion III is formed in two lines on a front of four companies, having two men to every pace of front. Battalion IV is formed in three lines on a front of two companies, *i.e.*, four men to every pace of front. Here two companies form the first, two the second and four the third line. Battalion V is formed in four lines but with the same front and with the same number of men per pace as IV, two companies being in each line. Battalion VI is formed on a front of four companies but in three lines, two companies being in the second and two in the third line. Here there are two men per pace of front.

Further there is nothing in the formation here suggested to prevent the several lines of a battalion manœuvring exactly as a battalion two deep; they can advance or retire in échelon of companies, half companies, battalions or brigades; they can change front, form column, or even square, if necessary. In changing front at small angles, however, it would be the better plan to wheel up the base "fire unit" into the new alignment and then direct the others to conform independently by order of the unit commanders. In this way, if the line was firing, each unit could take up the fire again as it arrived in its place and directly its front was clear.

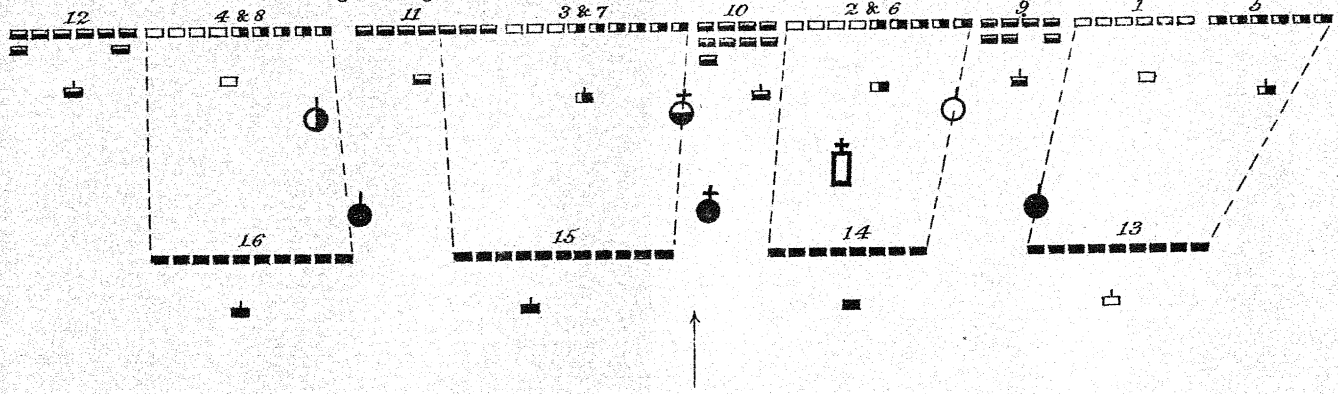
The following example (see diagram 2) will illustrate the conduct of the attack against a stubbornly-defended position.

A body of infantry, consisting of four companies of 24 files each, is directed to attack a given point in an enemy's position, the front available being represented by the width of the paper. Each company is told off into four sections or "fire units." It is found that the allotted lateral space is only sufficient for one company in the fighting line. No. 1 company is directed to form this line, and is opened out into single rank with a few inches between men and three paces between sections. No. 2 company is told off to form the first reinforcement, and follows No. 1 at a distance of 200 to 400 paces in such formation as its commander considers necessary. Nos. 3 and 4 companies follow as the main body further in rear. The officers all move out in front of their

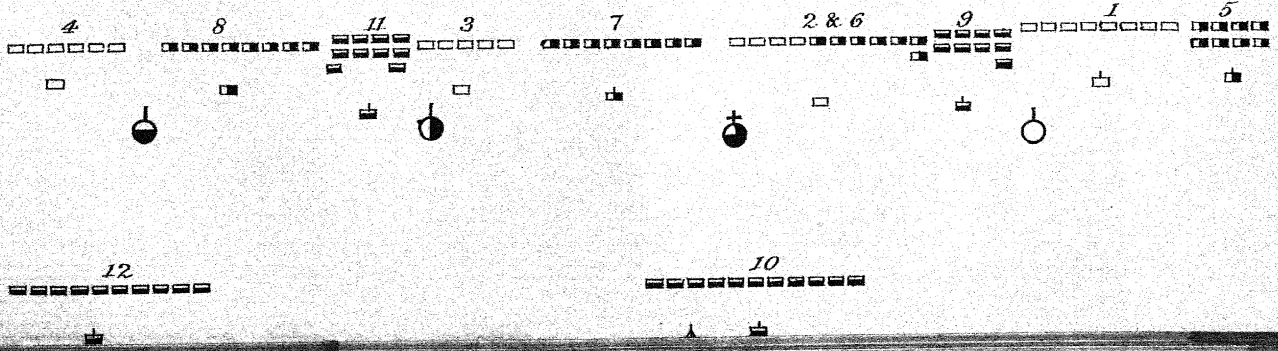
respective commands, while the N.-C. officers follow in rear of their sections, keeping the men together and preserving the strictest discipline. When the fighting line is required to open fire its officers fall to the rear, and the captain orders the number of section volleys, pointing out the object on which fire is to be concentrated. The volleys having been delivered the whole line advances at a steady run (no racing), each unit moving by its own centre straight to the front regardless of gaps on its flanks. When from 50 to 100 yards of ground have been gained the line again lies down, and when the men are steady opens fire as before, and so on. In the meanwhile casualties have occurred; the men of the several fire units have felt inwards and gaps have been created; the fighting line is checked. The commander of No. 2 company, who has been steadily gaining on No. 1, now determines to reinforce. The company advances and, when within 50 yards or so, breaks into a steady run by word of command, the several sections being directed by their commanders towards the gaps in their front; the bugles sound "the advance"; the first reinforcement runs through the gaps in its front with a cheer and carries the original fighting line forward with it for another 50 or 100 yards. The line is then halted, steadied, and section volleys are opened as before. It will be observed on referring to the diagram that the right section (5) of No. 2 company has no room to get up in the fighting line, so halts and lies down in rear when the rest of the line goes forward. The reinforced line continues the advance as before under the command of the senior officer, the remaining officers dividing the front, until more losses occur, more gaps are made and the line is brought to a standstill for the second time. Sections (2) and (6) have suffered so heavily that the nearest officer has combined them into one, and sections (7) and (8) have found room to open out into single rank. The second reinforcement now takes place by No. 3 company, and the right section (5) of No. 2 company (which No. 3 has picked up and brought on with it) joining the fighting line in the same way as No. 2 did. Sections (5), (9) and (11) throw themselves into the gaps and carry forward the line, while (10) and (12), for whom there is no room, remain lying down in rear. More losses occur; sections (3) and (7) and (4) and (8) have been ordered to combine, and sections (5) and (11) have been enabled to open out into single rank, but there are still gaps, and into these sections (10) and (12) have thrown themselves. In this way the line has been brought up to assaulting distance. No. 4 company has come up in rear, and the order for the assault is given. This last company reinforces the line, wherever weakest, with a cheer, the drums beating and the bugles sounding "the advance." The whole line moves forward at a steady double, the men fixing bayonets (if not already fixed) as they move forward; the bugles sound and the drums beat "the advance" repeatedly, and each time the men cheer and quicken the pace until presently "the charge" sounds, when the whole line goes in with a rush. But suppose the attack does not succeed and is brought to a halt, a tremendous fire would probably be opened by the men without word of command, for

DIAGRAM 2.

Fighting Line just before last reinforcement.



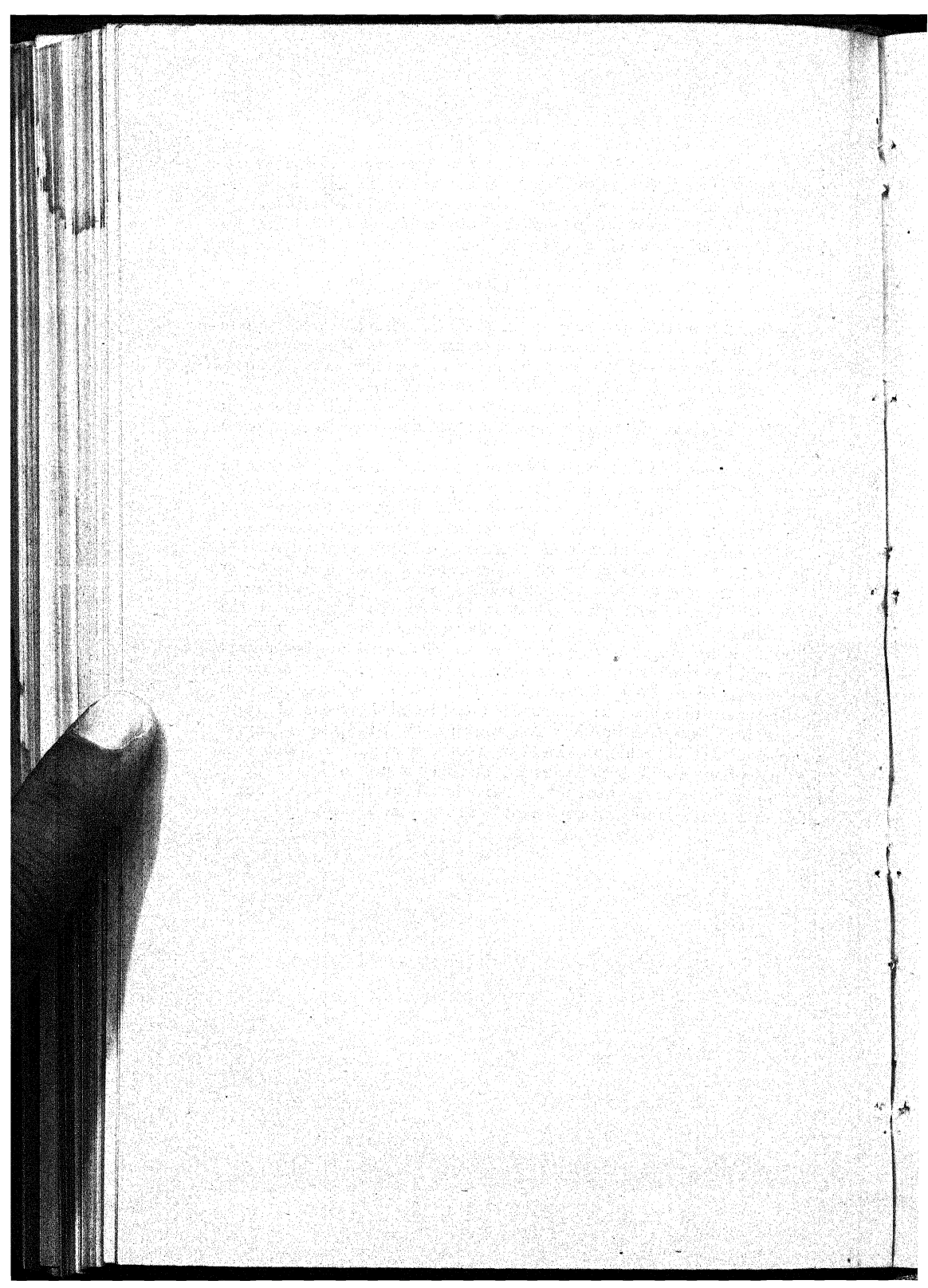
Fighting Line after 2nd „ reinforcement.



it must be remembered that their nerves would by this time be strung to the highest pitch, and perhaps they would maintain their ground for a few minutes. A "second line" in rear is at this time indispensable and would have to be brought up in order to force the position.

This, as well as every other, method of conducting an attack must be constantly practised at *drill* in order to obtain perfection; first on open level ground, without firing, then on broken ground, and finally at field firing. Men *must* be directed to fall out at drill, as well as on field days, in order that those still left in the ranks may learn to close in instinctively so that gaps may be created, for without these gaps in the fighting line this system of reinforcing falls to the ground. It may offend the eye of the sergeant-major to see his parade ground dotted all over with men who have fallen out, but it is the only way to accustom men to casualties, and the more they are drilled to it in peace the steadier will they be in action, when the casualties are made by the enemy's fire.

It is quite possible that, when subjected to practical test, this system of reinforcing may fall through, in which case there is no help for it but to give up the obvious advantages of volley firing, as the Germans have been obliged to do, and drill our men to fire independently in a given direction a given number of rounds as steadily as circumstances will admit. It is the choice of two evils, and appears to me to be far less than the present one, which, immediately reinforcement takes place, entails confusion of commands, confusion of voices, and results in the men losing their heads and firing wildly and finally passing out of all control. When magazine rifles are issued the chances of wasting ammunition will be much reduced when firing independently. The ammunition should be made up into convenient five-round packets, and when the fire pauses take place the magazines would be filled by one of these packets being emptied into it. The men then, on getting the command to "commence fire," could not fire more than five rounds as often that the magazines would become empty, and they would not be allowed to load up again without word of command. Thus fire pauses would establish themselves without any exertion on the part of anybody.



SHELTER TRENCHES AND ENTRENCHMENT TOOLS.

By Colonel W. Luckhardt, C.B., A.D.C.

Together with the progressive improvement in firearms there arose simultaneously the question as to what steps should be taken on the other hand to prevent the terrible losses inflicted by these arms of precision, and hence it has come about that the pickaxe and shovel are no longer solely employed in the preparatory stages of a battle, but have become important factors themselves on the battle field. Though it would appear that these questions should go hand in hand together, this has practically not been the case. Considerable attention has been paid to the way in which the deadly effect of the modern arms of precision should be counteracted, yet it must be admitted that a hesitation has always made itself felt to give such a system a full scope of development. The reason of this is not far to seek. The value of protective works is everywhere fully acknowledged, but there is a general fear to avail oneself too freely of the advantages offered by them, as the possibility has always presented itself that the profit thus gained may be more than counterbalanced by the disadvantages which are inseparably connected with the abuse of such a system ; in other words there is a feeling of uncomfortableness that troops may cling too much to these protective works, which may therefore render them unwilling or half-hearted in the further progressive stages of a battle. There is consequently considerable difficulty to separate strictly the limits as to what extent the advantage should be utilised, and at what point abuse may be feared to result, so as to render them prohibitive. The proper solution of this question is evidently reserved for the future, since the experience hitherto acquired has not been sufficient to bring about a conclusion which we might consider satisfactory. However, although the correct solution may be veiled in doubt, the fact is clear that no army can neglect the subject without results, which, if not disastrous, might certainly call for regret that sufficient attention was not paid to it. As a prominent illustration we may point to the Turko-Russian war. Amongst the many evils which revealed themselves during that campaign not the least was the total want of portable entrenching tools. Owing to faulty tactics attacks were often undertaken against formidable positions without sufficient preparation by artillery. It is evident that success could only be obtained under such circumstances at a frightful sacrifice of life. However, if the bravery of the troops overcame these difficulties and carried the positions, they could not be maintained owing to the inability to render them tenable by throwing up protective earthworks. Hence it frequently occurred that positions taken at a

tremendous cost were lost again. There were many instances of this kind throughout the month of September, when Skobeleff made his various attacks on the green mountains of Plevna, and it is said that the want of entrenching tools to render those positions tenable when taken was so much felt that the troops actually dug up the ground with their bayonets, and by means of their cooking-pots managed to throw up earthworks and protect themselves from the murderous fire of the Turks. The Roumanian army was much better off in this direction, as every second man in it carried the portable spade invented by Linneman. This practical instrument has since been introduced in the Russian army. We take this opportunity to show below a comparative abstract detailing the relative equipment in the matter of entrenching tools prevailing in the different armies :—

Country.	War strength of Company.	No. of spades per Company.	Proportion of spades to the number of combatants.	No. of axes in the Company.	No. of pickaxes per Company.
Germany ...	250	100 (system Linneman.)	½, 5	10	5
Russia ...	200	80 (system Linneman.)	½, 5	20	...
Austria ...	198	99 (system Linneman.)	½,	...	...
France ...	250	32 (system Linneman.)	⅐, 8	3	12
England ...	100	50 (System Wallace.)	½	?	?

Continuing in our remarks regarding the Russian army it may be noted that in addition to the personal equipment the company baggage wagon which is allowed to the Russian infantry carries an additional supply of 24 spades, 10 hatchets, 5 shovels, 1 crowbar and 3 pick-axes. It will thus be seen that the former neglect no longer exists, and that, on the other hand, the Russian army must be considered to be liberally supplied in the matter of entrenchment tools. The importance, moreover, which has been paid to the subject shows itself amply in the different regulations which have been issued and which we summarise as follows : As a general rule it is laid down that in defensive positions earthworks are always to be erected whenever it is found that the ground does not offer sufficient cover for protection. In offensive movements the same is ordered to be done in every instance in which the necessity is felt to maintain a position which has been taken and when consequently a counter-attack may be expected to retake the position. The regulations further direct that earthworks should be thrown up in all cases when fortified positions will act as a point of support for further forward movements, or when such a position may be considered to prove itself useful to facilitate retiring movements in cases of failures of attacks. To prevent an abuse in the use of the spade the instructions ordain that in all operations of an offensive nature the permission of the

General Commanding is to be obtained previous to such work being commenced, whilst in those of a defensive nature it is to be considered an understood thing that earthworks are to be erected wherever possible, and permission is only to be obtained if there is ample time to allow of this being done. Once an order is issued to fortify a position it becomes the obligation of the different military commanders to throw up the necessary earthworks within the extent of the ground occupied by their troops, and all responsibility that this is done to the fullest extent rests with them. Commanders are specially enjoined to see that the necessary aid is rendered by infantry fatigue parties to the artillery to enable it to throw up fortified positions for its guns. Great attention is directed to be paid in throwing up earthworks to the fact that this work is to be performed in such a manner that the quickest possible protection is obtained in the shortest possible time, and that the probability of the position being attacked before completion of the works is foreseen. Hence the stronger profiles are to be gradually developed from the weaker ones. We may classify the profiles recognised in the Russian infantry under the following headings :—

Profile No. I. For soldiers lying down.
„ No. II. For soldiers in kneeling position.
„ No. III. For soldiers standing.
„ No. IV. For soldiers standing and enabling them to stand the fire.

To ensure that the parapet offers a sufficient protection against infantry as well as artillery fire it is directed that, in the case of sandy ground, it should not be made weaker than 1·5 feet (·49 metre) and in clay ground 2·5 feet (·82 metre).

At the flanks these works are to be turned back, and these parts, as well as others which are exposed to an enfilading fire, are to be protected by epaulements.

If a company gets the direction to fortify its position, half of it, *viz.*, two sections, are kept intact, and it is the duty of the latter to carry out all protective measures by furnishing a skirmishing line, *i.e.*, to protect the other half company at work. When the men at work are tired out they change position with the former. As a particular illustration of the manner in which attention has been paid to the subject it may not be without interest to mention below the instructions which direct how earthworks are to be thrown up under fire :—

Directly a company receives such an order every man who is not protected in any way by the nature of the ground is directed to lie down, and, lying on his left side, he is told to commence digging up the ground to the extent of from the elbow to the knee and to the distance of about the spade's handle and to the depth of about the width of the spade.

The earth thus obtained is to be deposited close to his head to form, as soon as possible, a protection to it. The digging of the ground of the dimensions above noted having been completed, he is told to place himself in the excavation thus formed, and, lying on his right side, to repeat the work in the same way as before. When finished he hands over the spade to his neighbour, who now in his turn performs the work in the same manner. The men not actually thus employed are told to

avert the enemy's attention by keeping up a continual fire. Earthworks are finally ordered to be carried out in such a manner as to render them as similar as possible to the general features of the ground, and therefore difficult to distinguish.

The distances in front are ascertained by pacing them, and the points so obtained are marked by stones. Any object which can afford shelter to an advancing enemy, such as trees, boulders, &c., are to be removed. Every year each infantry regiment sends a party consisting of officers, non-commissioned officers and soldiers to a corps of sappers with the view of undergoing a regular course of training, and these parties on their return are again made use of in instructing the regiment generally.

We have given above a rough outline of the rules by which the Russian army is guided, and we purpose now to particularise the instructions which obtain on the same subject in the Prussian army.

The Prussian regulations say that cases may often occur when an infantry officer may be called upon to fortify a position without aid or assistance from an engineer officer. It is consequently considered a matter of importance that an infantry officer should possess sufficient knowledge to enable him to carry out works of this description without aid. The following instructions are given for guidance :—

Profiles for the erection of entrenchments are divided as under :—

(1) For men lying down.
(2) For men kneeling.
(3) For men standing.

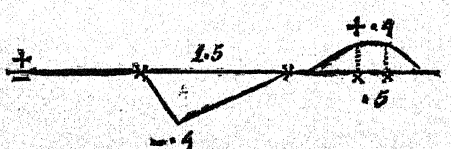
The entrenchments for men lying down have the advantage that they can be most swiftly thrown up, and afford therefore the quickest protection. The disadvantage, however, connected with them is that they do not afford such sure protection as others would, since a man by lying down offers a considerably larger mark for chance hits from the enemy's fire than one in a standing position. However, on account of the greater facility with which they are erected, they will generally have to be adopted in temporary positions, whilst in entrenchments of a more permanent character profiles for men standing are preferable.

The spade in use with the infantry has a length of ·5 metre, divided as follows : ·2 metre the length of the blade and ·3 metre that of the handle.

The profiles for an entrenchment for men lying down are regulated as follows :—

Height of parapet=twice the length of the blade of the spade, equal therefore to ·4 metre.
Depth of the ditch ditto ditto ditto ditto.
Width of the ditch, thrice the length of the whole spade, equal to 1 5 metre.
Width of the parapet, equal to the length of the spade= ·5 metre.

PROFILE I.



In an entrenchment required for men kneeling down the dimensions are as follows :—

Height of parapet, once the length of the whole spade = ·5 metre.

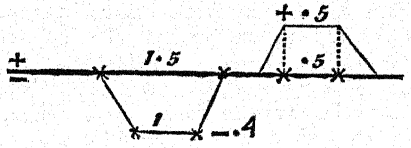
Depth of the ditch, twice the length of the blade of the spade = ·4 metre.

Width of the ditch on the top, three times the length of the whole spade = 1·5 metre.

Width of the ditch at the bottom, twice the length of the whole spade = 1 metre.

Strength of the parapet, once the length of the whole spade = ·5 metre.

PROFILE II.



Entrenchments for men standing are constructed according to the following dimensions :—

Height of parapet, one and half the length of the whole spade = ·75 metre.

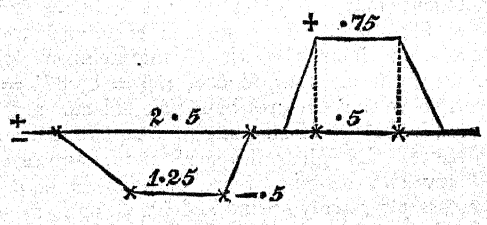
Depth of the ditch, once the length of the whole spade = ·5 metre.

Width of the ditch on the top, five times the length of the whole spade = 2·5 metre.

Width of the ditch at bottom, two and half times the length of the whole spade = 1·25 metre.

Strength of the parapet, once the length of the whole spade = ·5 metre.

PROFILE III.



As a rule the stronger profiles will have to be developed gradually from the weaker ones, especially in cases where the entrenchments have to be erected under fire, and where it becomes therefore a factor of importance to obtain protection as quickly as possible.

No normal rules can be laid down for the tracing of the lines on which the entrenchments are to be erected, but the principal point to which attention is to be paid should be to see that they are not exposed to an

enfilading fire from the enemy. If this danger cannot be averted by turning the lines backwards it will be necessary to erect traverses, which is to be effected by leaving the ground at certain intervals undisturbed to the extent of the space of half a metre and by strengthening the wall thus left with the earth obtained from the ditch at its left and right.

The instructions further direct that attention is to be paid to render these entrenchments as similar as possible in appearance to the general features of the surrounding ground, and as freshly thrown-up earth is discernible a long distance off, it is recommended to cover its surface with grass, leaves, &c., according to the description of the ground. The principal point, however, to be observed in the erection of earthworks should be the consideration that they afford the fullest freedom to the use of the rifle. The ground should, therefore, as much as possible, be so selected that the country in front offers little or no protection to the enemy. With regard to the extent of these entrenchments it is to be observed that they are made proportionate to the number fixed for their defence; a front space of ·8 metre should, therefore, be allowed per man. For a body of two sections, say 70 men, a front space would, therefore, be required of ·8 × 70 = 56 metres.

The following calculations are generally accepted as the working power of a single man:—

Per hour in sandy ground	...	... 1 c.m.
„ in garden ground	..	... ·75 c.m.
„ in clay ground	...	.. ·5 c.m.

On this is fixed the calculation for time required for the erection of works. Thus an entrenchment for 70 men according to Profile III would in garden ground be worked out as follows: The profile of the ditch (Profile III) forms a triangle with bases of 1·25 and 2·5 respectively in length and a height of ·5 metre; consequently the area of it is $\frac{1·25 + 2·5}{2} \times ·5 = ·9375$ square metre.

As the entrenchment is intended for a body of 70 men the extent of it is therefore 56 metres, and consequently the cubic space of the whole entrenchment may be taken as ·94 × 56 = 52·64, or say, in round numbers, 52·5 c.m. As a man is calculated to dig in garden ground ·75 metre an hour, the whole entrenchment will require, if it is to be thrown up in one hour, 52·5 × ·75 = 39·375 = 40 men.

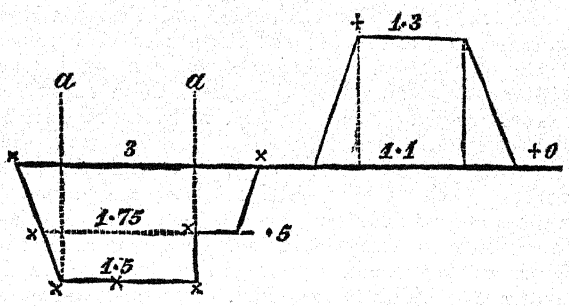
We have seen above that the area in Profile III amounts to ·94 square metre. The area in Profile II amounts to ·5 square metre and in Profile I to ·3 square metre. In light soil a spade should suffice per man, but if the soil is heavy and contains roots or stones a hatchet or pickaxe will become necessary for every second and fourth man, respectively.

To perform the work the fatigue party should be formed up in one line behind the line which should be traced out by the non-commissioned officer, and the men, after having laid down their rifles, should be ordered to move up to the traced out line, and form up here at intervals of a full arm's length from each other and be told to commence work.

In the case of Profile I it appears advisable to trace out the line at that point where the ditch will have its greatest depth, and to arrange for the scarps being gradually cut down afterwards.

In the case of Profiles II and III the line traced out should be the front bank of the ditch, and the men should commence to work at this point. The above profiles should be strengthened considerably in the case of troops kept as supports and where time is not so much of consideration as strength. Profile IV below shows the dimensions which should be usually adopted for these cases, and which offers a better protection as well as a better view, and with it a better command of fire over the country in front. It will be seen that the height of the parapet is fixed at 1·3 metre, the necessary height to enable the men to level their rifles over the parapet.

PROFILE IV.



At an entrenchment of this description two lines of men can be employed at points *a a* until a depth of ·5 metre is reached. Thus, for instance, an outlying picket of the strength of 70 men has left at its disposal, after arranging for its double sentries, say 50 men, of which it is intended to use 30 men for the defence of an entrenchment and the balance as a reserve to make up for eventual losses. The entrenchment is ordered to be made in accordance with Profile IV. We have, therefore, the extent of an entrenchment for 30 men = 30 × ·8 metre = 24 metres, and to work in reliefs this will give for the first body of men a cubic space of ground to be excavated $\frac{3+2\cdot5}{2} \times \cdot5 \times 24 = 33$ cubic metres, and will consequently necessitate the employment of 25 men. The relief will have left to it to excavate $\frac{1\cdot75+1\cdot5}{2} \times \cdot5 \times 24 = 19\cdot5$ cubic metres, and will therefore require about fifteen men, who can only work in one line, and the balance should be made use of in treading down the earth used for the parapet, &c.

We will now consider what deductions we should draw from the above. It must, in the first place, be determined whether we are correct in forming the only exception to the otherwise universal custom of having the entrenching tools carried by the men themselves. This departure can only be accounted for, we presume, in our anxiety to equip our men as lightly as possible and thus afford them ease and comfort. The weight of a spade amounts only to 4lbs. This in itself represents a small figure, but when it is considered that its addition to the other articles of equipment carried in other armies swells

considerably the total personal load of the soldier, it must be admitted that important considerations must have been thrown into the scale to arrive at the decision that the entrenching tools should be carried by, and not for, the men. The experience gained by the Russians in their Turkish campaign has shown us that the absence of entrenching tools was very sorely felt by them, as it contributed to a very large extent to loss of positions gained at considerable sacrifice of life. We believe we are not taking an extreme view of the case when we say that the long time taken by the Russians to capture the fortifications of Plevna was due, in a great measure, to the paucity of entrenching tools and to faulty tactics arising from want of appreciation of their use. There can hardly be any doubt that these shortcomings did not escape the notice of other armies, and that considerably more attention is now paid to the use and importance of entrenching tools than was the case before. Hence the question we have under discussion is practically reduced to the consideration as to whether our present arrangement, by which we expect to ensure their being close at hand at the required moment, is so perfect that we can fully depend upon it, and whether we are in consequence right in not burdening our soldiers with their weight. We are afraid that the experience we possess on this point is altogether confined to the manœuvres which we carry out in peace time in mimic warfare. Here, no doubt, our existing arrangement of getting the tools carried in racks on mules leaves nothing to be desired. The mules can accompany the troops anywhere, and the racks are so arranged that spades and pickaxes can be detached therefrom with the perfect ease and without loss of time. However the question assumes another aspect altogether when we imagine ourselves in actual warfare. It appears to us very improbable that the drivers, being non-enlisted followers, will ever care to follow up the regiment when it dissolves into open order on its arrival into the zone of fire. However, setting aside this consideration, it must be acknowledged that the mules will offer a good target to the enemy, more especially when it is considered that any little object or inequality of ground which will suffice to protect the men will offer no security to the mules. The animal's life under such circumstances will, of necessity, be of short duration, and consequently their death will render the continuance of entrenching tools a matter of impossibility. A little reflection will clearly show that men thus circumstanced will not pay the slightest heed to the loss of these articles, as all their attention will naturally be concentrated in another direction, *viz.*, in the rush on the enemy's position, and their foresight will not go beyond that point. The loss, however, of the tools will be bitterly felt after the position is taken, and, when the time comes for holding it against the enemy to prevent its being retaken, we are afraid that the consequences which may result from entrenching tools being lost in this manner have not had sufficient attention paid to them.

We are, moreover, of opinion that, although, as we have shown above, great stress is laid in modern armies on the matter of entrenching tools, the subject has not, properly speaking, received that consideration

which it really deserves. This we believe has its cause in the fact that all nations are at present bent upon the adoption of offensive tactics. It is a most curious phenomenon that the improvement effected in modern arms has led to this result. It is a problem rather difficult of solution, for, with ordinary reasoning, one would conclude that the result of improvement in arms should naturally tend to exercise a most beneficial influence on defensive tactics. This is, moreover, proved by the fact that their introduction has resulted in the total collapse of former modes of attack and in the adoption of new and difficult formations. The uncertainty which also prevails in this respect is evidenced by each nation having invented and adopted a distinct system of attack formation. It is entirely a problematical matter as to what nation has selected the best. Yet, notwithstanding these difficulties, and the further fact that one arm, *viz.*, cavalry, has nearly been thrown out of consideration by the introduction of modern arms, we see that everywhere defensive tactics are set aside, and that every nation hopes to find its salvation in the adoption of offensive operations. Wherever we look we see that the training imparted, from the highest commander to the lowest private, has for its object offensive tactics, which, it is inculcated in their minds, can alone lead to victory. Pure defensive is looked upon as certain destruction of an army, and for this reason offensive tactics are considered necessary to be combined with the former as an element necessary towards the attainment of success. How these deductions have been arrived at does not at all appear clear to us, and we have our doubts as to whether these principles have not been fixed as axioms without any fundamental basis. It is more than probable that, owing to the excessively large armies employed now-a-days, nations feel that the extraordinary strain which is brought on their resources is so immense that it cannot be maintained for any length of time, and to avoid what is considered an unavoidable collapse they have accepted short and decisive tactics. It seems to us more than dubious that a nation not so situated, and one which will find a long-continued strain more to its advantage, should accept these axioms as applicable without a fuller enquiry, and this is a matter of extreme importance to us. Circumstances place us here (in India), strategically speaking, on the defence, Russia being the attacking party. Should we arrive at the conclusion that it would be advantageous to maintain the defensive more closely than other nations are inclined to do so at present, it is evident that the most prominent attention should be given towards uniting the power of the rifle with the power of the spade. If the views herein set forth are accepted, even to any extent, it is obvious that we must consider the spade and pickaxe to be of more intrinsic value than we have hitherto given them. Hence the consideration we have hitherto shown our men in carrying the tools for them must be put aside, since we cannot afford to depend on their being found ready at hand when required by such haphazard means

as we employ at present. The importance thus attached to them will carry inherently with it the necessity of obtaining greater efficiency in their use, and consequently will give this branch the training it deserves.

SUPPLY OF SMALL ARM AMMUNITION ON THE BATTLE FIELD.

By Captain J. Haughton, 35*th Sikhs*.

The following notes are confined, as far as possible, to the consideration of the supply of ammunition which might be necessary for one day's fighting.

For convenience the subject may be divided into five headings, *viz.* :—

I.—Amount of supply.
II.—The supply carried by the soldier on the march.
III.—The supply carried for the soldier on the march.
IV.—Replenishment during action.
V.—Peace practice.

I.—Amount of Supply.

The number of rounds available on the battle field varies in different armies from 128 7 in the German army to 196 per rifle in the Russian army. The British supply is 130 rounds per rifle.

A further supply is carried by most armies as an army corps reserve, but this would not usually be available during a battle.

To form an opinion whether the present supply is sufficient we must, as far as possible, consider the experiences of recent wars and also any causes which might tend to increase or decrease the expenditure of ammunition in our army.

Is the present supply sufficient?

As regards the former experiences the data are not very satisfactory owing to the improvements which have taken place in firearms since the last great war.

In the Franco-Prussian war the expenditure was as a rule small, but nevertheless in many cases we hear of ammunition running short; on the Prussian side, for instance, at the battle of Spicheren, in the fighting at the Rotherberg and Gifert Forest, after temporarily successful advances, and at the battle of Viouville-Mars la Tours, in the fighting at the Bois de Boulogne and at the Trouville copses also after advances. On the French side we have a notable instance at the battle of Gravelotte, where the failure was less excusable as it occurred on the defensive.

In the Russo-Turkish war the expenditure of ammunition was very great, the Turks firing, on at least one occasion, as many as 150 rounds per rifle and some Russian regiments 143 rounds per rifle; but undoubtedly there was great waste of ammunition on both sides. We may reasonably hope that our own fire discipline is now (though only recently) better than that of the Russians during their last war. Nevertheless there are many considerations which make it probable that our

expenditure may be as great or greater than that of the Russians above mentioned.

Long range fire.

Amongst other reasons it must be remembered that our present arm (the Martini-Henry) is superior to any Continental rifle at long ranges, though possibly somewhat inferior at short range. Such being the case we should be throwing away an advantage were we to confine our fire to the ranges at which our enemy would be more on a par with us in this respect. The moral effect of punishing him at a range where his own fire was innocuous would doubtless be great, and might lead to his opening fire at ranges unsuitable to his rifle, as was the case with the Russians when opposed to the Turks.

As far as can be judged our new rifle will maintain its advantage at the longer ranges, whilst being at least equal to any rifle of Continental armies at short range.

Were it a question of how a small amount of ammunition could be best expended it would undoubtedly be best to reserve it for short range, but our resources being great and our army small we can hope, to some extent, to make up for the deficiency of our numbers by the accuracy and *amount* of our fire, that is, by its useful effect.

Another point in favor of our use of long range fire is that we now have a serviceable infantry range finder; amongst others the invention of Capt. Bate, R.E., may be noted. With this range finder, although the actual distance of moving bodies could not perhaps be ascertained, the distance of various objects in their line of advance could quickly be found and noted. None of the foregoing remarks are intended to recommend the use of long range fire by a fighting line advancing to attack. Such fire should be carried out by special bodies detailed for the purpose.

Magazine fire.

It appears certain that we shall before long be armed with a magazine rifle. Will such a rifle increase the expenditure of ammunition?

The Germans who have adopted a magazine rifle appear to have interdicted the use of the repeater except at short ranges. This may be partly due to defects of their magazine apparatus, which has been adopted with a view to suit their existing rifle rather than because it is the best apparatus possible. It may be also partly due to unwillingness to increase the expenditure of ammunition and with it the amount of transport, which with their enormous armies would be a specially serious question. Mayne, in writing of long range fire, says that it is advantageous whenever the objective is suitable to the range. This maxim is still more applicable to the use of the repeater, for the strong point of the magazine rifle is that it allows the fullest advantage to be taken of *fleeting* opportunities. At long range the occasions when the objective would be suitable would usually be fleeting, because the objective, if a body of troops in close formation, would as soon as possible alter its formation by deployment or extension. Another suitable objective would be a battery coming into action, when the most favorable moment would soon pass. Of course the objective would only be

suitable when the range was approximately known, which on the defensive would or should generally be the case. On the other hand it might be said that batteries and columns would not approach to within even long range of hostile infantry. They certainly did do so, and even to medium range, in the Franco-Prussian war, and would do so again if they discovered that the hostile infantry did not fire at such ranges.

The magazine rifle will undoubtedly cause a small increase in expenditure of ammunition in the final stage of attack.

If these deductions are correct we shall have an increase in expenditure on account of the extended use of long range fire and also on account of the introduction of the magazine rifle, but there is a limit placed on this increase by the physical impossibility of firing more than a certain number of rounds with any useful effect.

Taking into consideration the ammunition supply of possible enemies it appears that we should not have a less supply than 200 rounds per rifle available on the battle field. This amount, indeed, may be sometimes exceeded by individual companies or even battalions, but other companies and battalions would expend less and ought to assist with their reserve ammunition.

II.—The Supply carried by the Soldier on the March.

Weight & amount.

In a recent article by Colonel Luckhardt, C.B., that writer gave it as his opinion that the number of rounds carried on service by the soldier could be considerably increased in India, because the soldier has his kit carried for him. Would not, however, the reasons which make it advisable that a soldier's kit should be carried for him also preclude any considerable increase in the weight of his ammunition on the line of march?

Lieutenant Wilson of the United States army proposed a novel plan for carrying ammunition, which is worthy of experiment, but there appears to be one strong objection to it. Would not the ammunition, unless tightly sewn in, be liable to drop out once the package had been opened for use; and, if secured sufficiently tightly to prevent this, would not the loading be a slow process? If, however, the ammunition for the new rifle be packed in holders containing the number of rounds fed into the magazine at one time there would then be little danger of cartridges being lost, but the holders might be liable to damage.

Undoubtedly, with the ammunition of the future rifle, it will be possible to carry a greater number of rounds, because the ammunition will be lighter owing to the smallness of the bore.

At present the Russian soldier, whilst carrying 14 rounds more than the British (84 against 70), only carries about one ounce more weight of ammunition.

Here we may note that, unless the ammunition of our new rifle is heavier than that of any other European army, a box weighing about a maund should contain about 800 rounds.

The present weight of Martini-Henry ammunition carried by our soldiers is about 7½lbs.

Taking the weight of our future ammunition as the same as Russian, 90 rounds would weigh 8⅕lbs., not much of an increase.

How carried. This amount might be carried as follows :—

10 rounds in breast pockets (bandoliers) as at present.
40 rounds in ball bag, as can be done at present.
40 rounds in one pouch rather larger than the present pattern.

The present pattern of accoutrements are planned with a special view to carrying the valise. As the valise is not carried in this country it is probable a more suitable equipment might be introduced.

A pouch to carry forty rounds of the new ammunition need not be larger or heavier than the pouch till recently carried by our men. One large pouch empty would probably weigh less than two smaller ones and would do away with the inconvenience of having a pouch on the left side, which greatly incommodes men lying down.

Although it may be inadvisable to increase to any extent the weight carried by the soldier on the march, it will be necessary to increase his supply of ammunition immediately before going into action. For this reason, previously to coming within infantry range of the enemy, a further supply of fifty rounds per man should be served out. It is believed that by the system hereafter proposed this could be done without any serious delay. This further supply when served out might be carried—30 rounds in the havresack and ten rounds in each of two tail pockets. Mayne proposes an extra havresack to be worn at the left side, but any extra accoutrement is a nuisance and an expense ; besides which anything at the left side is apt to interfere with a man lying down. The small amount of ammunition suggested would probably incommode a man less in these tail pockets than in any other position.

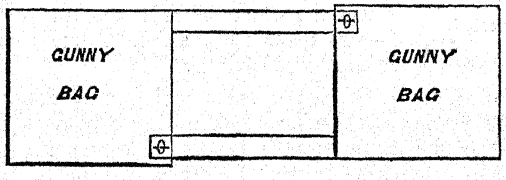
The tight, skimpy, unserviceable garments delighted in by the British soldier would not permit very probably of these tail pockets, but the more serviceable blouse of the Native infantry could easily be provided with them.

III.—The Supply carried for the Soldier on the March.

Package. It is probable that in India it will always be found most convenient that ammunition should be packed, as at present, in boxes weighing, when full, about one maund. With the Martini-Henry such a box contains 600 rounds, but it is probable that with any future rifle the ammunition will be so much lighter that a box containing 800 rounds will weigh about one maund.

The present box has a small sliding door, and to serve out ammunition is a slow process as it must be taken out almost packet by packet. To obviate this disadvantage it is suggested, first, that the boxes should

open with a lid like ordinary boxes ; and, secondly, that the ammunition of each box be ready packed at the arsenal in four bags of canvas or sacking. Each bag to be provided with a broad band of the same material, fastened at one end to the bag and the other end having a loop or button hole, the opposite side of the bag having a button or knob. The object of this arrangement is to enable two bags to be buttoned together to form one double bag, something like the present canvas ammunition bag.



To carry two of these bags the bearer merely puts his head through so that one band rests on each shoulder. To carry one bag the band is looped on to its own button and the band placed over the shoulder or held in the hand. Each bag would contain a quarter of a box or 20lbs. weight.

The double bag, weighing 40lbs., would not be too heavy for a man to carry, say, one mile.

With ammunition packed in this manner the work of distribution would be very much facilitated. On the order to serve out ammunition, the box having been opened, the bearer would take out two bags and carry them to his company, hand one bag to the leader of the first section and proceed at once with the other to the next section. The section commander would at once tear open the bag and hand or throw a packet to each man. Under the arrangements existing at present there would be a considerable delay, first, in taking the ammunition out of the box, then in putting it into the bags. When arrived at the company the bearer would have to remain until the ammunition was served out to one section before he could go on to another, and then the bag must be returned to the ammunition party. Under the proposed system all this would be obviated.

There are two objections, however, which are, first, that the bags would entail a slight extra cost. This cost would be inconsiderable were the bags made of "gunny" and in peace time returned to the arsenal for use over and over again. The second objection is that a box with an ordinary lid could not be opened whilst on the pack as the present boxes can be, but, if a box could be quickly taken off the pack, this would be no disadvantage. To facilitate the loading and unloading of the boxes each pack saddle should have four chains of sufficient length to go round the box, through rings on the box, the chain hooking on to the pack saddle hooks. The present method of cording the boxes entails a considerable amount of labour, and when

done the boxes after all are only hung on the pack saddle hooks as they would be with the proposed chains.

Amount to be carried for the soldier.

Assuming that the battle supply be fixed at 200 rounds, and that the soldier can carry 90 rounds out of this amount on the march, we have to provide carriage for 110 rounds *on the march*. Assuming, further, that 50 rounds more be served out to him on entering action, we have to provide carriage for only 60 rounds during action.

How best carried.

If mobility were the only point to be considered there is little doubt that the whole of this amount would be best carried on pack animals, but there are many other points to be taken into consideration.

The army of India is liable to such varied conditions of fighting that no one system is applicable to all our little wars. In some cases coolies might be the only possible means of transport; no one would on that account propose that coolie transport should be our only recognised system. Let us consider the case of a war against a European power. In any such war the opposing forces would be large, and the difficulties of supply would probably confine the theatre of war principally to such a country as would also be suitable to field artillery.

Is there any reason why ammunition carts could not be constructed on such a plan that they could travel anywhere that artillery could move?

It may be at once allowed that a certain amount of pack transport would always be necessary, but there are so many arguments against the large use of pack animals that the advantages and disadvantages of that system compared with wheeled transport deserve consideration.

Advantage of pack transport.

(*a*) One advantage of pack transport, and it is a very great one, is that it can move almost anywhere that infantry can. For this reason it would always be advisable *in action* to have a certain amount of reserve ammunition on pack animals.

(*b*) The loss of one animal would *probably* entail a less loss of ammunition than the loss of one cart (see, however, disadvantage *g*).

Disadvantages of pack transport.

(*a*) Any system of pack transport requires at least double the amount of animals and drivers required for the same weights by wheeled transport. Taking the strength of a battalion as 800 rifles, the ammunition to be carried as 110 rounds per rifle, and the contents of a box as 800 rounds, we should require 55 mules or ponies per battalion (not including spare animals).

With Martini-Henry ammunition, the men carrying only 70 rounds, 87 mules would be required for a total supply of 200 rounds per rifle. For a brigade of four battalions the numbers would be 220 and 348 mules respectively and 74 and 116 drivers; but the actual amount of transport on account of ammunition does not end here, for a further

amount would be necessary to carry the food, spare saddlery, medicines, &c., of these mules and the food and shelter of the drivers (in a rigorous climate shelter *ought* to be provided, though not always done).

(*b*) The enormous extra labour of loading and unloading pack animals before and after a march. With wheeled transport this is saved as carts remain loaded.

(*c*) The great addition to the length of the column.

(*d*) The immense amount of fatigue to the animals owing to their remaining loaded for many hours.

This is a most serious objection. During a march of 15 miles animals would only be actually marching for, at most, 5 hours, but in an enemy's country they would probably remain loaded for double that time, often treble, and even longer. The troops are frequently halted and get a certain amount of relief, but it is no relief to a pack animal to be halted with a heavy load on his back. It is this remaining loaded for hours which kills more transport animals than the actual length of the march. With wheeled transport the animals get a certain amount of relief whenever halted, even though they may not be taken out of the carts, which latter would take but little time and labour compared to unloading and reloading pack animals. With wheeled transport the animals could even get a feed whilst in the cart, which they could not under a pack load.

(*e*) Pack animals cannot be taken out of a walk without seriously displacing their loads and thereby causing great delay to re-adjust, or, worse still, getting sore backs and becoming useless. Even at the recent camp of exercise this was a serious evil; what then would it be on service?

(*f*) The difficulty of feeding a large number of animals and drivers, not to mention the extra cost.

(*g*) With pack animals, if an animal is disabled, his load is absolutely lost unless spare animals are available. With wheeled transport, if one animal is injured, the cart may still be drawn at decreased speed by the remainder, or, if the cart be injured, the load may be distributed on other carts.

(*h*) In the event of the army being moved by sea the extra transport required by the pack system would require extra shipping.

Assuming the above deductions to be correct we see that, if wheeled transport could move with infantry, it would be far preferable to pack transport.

Any considerable force is hardly likely to move in a country impassable to wheeled artillery. Even in the march from Kandahar to Cabul, under Sir Donald Stewart, the force contained wheeled artillery, which does not appear to have met with any insuperable obstacles.

It must also be remembered that the main body of infantry would usually keep to some sort of road when not actually in action.

If then we could get ammunition carts as mobile as wheeled artillery it would be able to accompany the infantry under most circumstances,

and would be advantageous provided we could arrange for the pack transport of a certain amount of ammunition during action. Let us consider whether ammunition carts could move as required ; and, if so, what is the best form of cart.

Ammunition carts. What is required and proposed form.

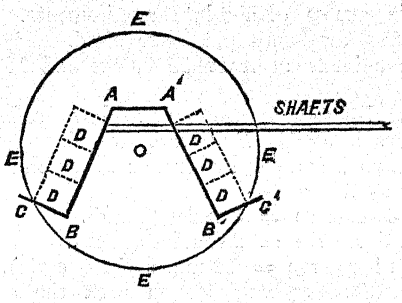
Probably none of the transport carts at present in use in this country could carry ammunition at a sufficient pace, except on a road, amongst other reasons, because they are hardly strong enough to bear the strain caused by rough ground (I do not speak of bullock carts, which would be too slow). The lighter description are only capable of being drawn by one animal ; the horse wagons in use at home and in other countries would require to be as well horsed as artillery if intended to go over the same ground, because the load is too great for a light cart. Lastly, not leastly, in most carts there is no means of fastening down individual boxes ; in those carts where this is arranged for the carts are useless for almost any other kind of load.

It is hoped that in the following suggestions it is shown that a cart without these objections could be constructed.

The present proportion of drivers in our service is one to every three mules. On the one hand we have so high an authority as Colonel Luckhardt suggesting that it might be advisable to have a larger proportion of drivers ; on the other hand we are told that in America one driver can manage six mules by the use of hard swearing. In this country either the mules are more used to it or strange oaths in Hindustani are less effective than those delivered in the American tongue. Any way a native driver could hardly manage more than three animals. It must be allowed that there are good grounds for objecting to any increase that can be avoided in the great army of non-combatants. On the whole the present proportion of three animals per driver is probably the best for our needs.

Taking then a team of three mules or ponies per cart as our standard they may be driven either unicorn fashion—two beasts with a pole as wheelers and one leader—or they might be driven three abreast, the centre one in shafts. The pole system has much to be said in its favor ; manifestly the animals thus harnessed would feel the motion of the cart over bad ground less than an animal in shafts. Although pole draft has been rejected by the Royal Artillery it has been maintained by that of some other nations, but in a cart it would have the objection that the empty cart could not be drawn by one animal as would be the case in the other system. On the whole, perhaps, shafts with a pony outrigged on either side would be the better plan. It is thought that a cart on the following plan would best combine the necessary qualities of strength, lightness, compactness, the means of fastening each individual box of ammunition, and the capability of being used for other loads, such as entrenching tools, tents, soldiers' kits, commissariat bags and barrels, &c., &c.

Tents would require to have the poles jointed, as is almost universally the case at present.



Scale—4 *ft.* = 1 *inch.*

A A′ foot.
A B 30 inches.
B C 18 inches.
E E E wheel 5 feet diameter.
D D ammunition boxes (breadth of cart=two boxes).
Breadth of cart 44 inches, to take two boxes lengthways.

These measurements are given as likely to suit for twelve ordinary ammunition boxes. All details are omitted in the sketch for the sake of showing the intended shape more clearly. A C should be joined by a rail ; also there should be supports between A B and A.′ B.′

The space between A B and A′ B′ could be utilised for carrying one day's ration for the mules. Every cart should be provided with one pick, one shovel and one axe. Numerous iron rings should be fixed on the back board (A B), (foot board) (B C) ; also on A A.′

The cart is intended to carry twelve ordinary ammunition boxes, but would be capable of carrying at least sixteen—six in front, six behind and four on top A A′ ; but only twelve boxes is suggested for the ordinary load to enable the cart to travel over the roughest ground.

As each cart carries a spade, pick and axe, nullahs could be quickly ramped by the escort.

The lightest load (12 boxes) is double the amount which can be carried on pack ; by the same number of animals therefore each cart would be a saving of three mules and one driver.

Whether calculations are based on boxes of Martini-Henry ammunition containing 600 rounds, or the supposed new ammunition containing 800 rounds, the proportions between what can be carried by pack and by cart will remain the same.

For simplicity's sake let us take a battalion 800 rifles strong and boxes containing 800 rounds, and the amount of ammunition be carried 110 rounds per rifle ; this would give us 110 boxes to be carried. On the march this might be done as follows :—

Per battalion	eight (8) pack mules	= 16	boxes,	1st reserve.
,,	four (4) carts	= 48	,,	2nd reserve.
,,	four (4) carts	= 48	,,	3rd reserve.

Or two boxes in excess of absolute requirements. By this system 32 mules and 11 drivers would be required. If the whole were carried by pack animals at least 55 mules and 19 drivers would be necessary.

If it is considered absolutely necessary to have a larger amount of ammunition on pack *during the march* we might carry the first and second reserves on pack and third reserve in carts ; this would require a total of 44 mules as follows :—

1 boxes, 1st reserve = 8 mules (pack).
4 boxes, 2nd reserve = 24 mules (pack).
4 ∞ boxes, 3rd reserve = 12 mules (in 4 carts).

With the whole of the ammunition on pack the ammunition train would be too long for the whole of it to accompany its own battalion on the march, but with only 8 pack mules and 8 carts this would be possible and advisable. I cannot help thinking that, if possible, it is much better to have the whole of the ammunition (for one day) in battalion charge rather than split up into brigade or divisional reserves.

Supposing that on the march the whole of the ammunition accompanies the battalion at once, when the force is ordered to deploy, 50 rounds per rifle should be served out from the carts, leaving the pack ammunition intact. This would absorb the whole of the first four carts, which being now empty could be drawn by one mule, thus setting free 8 mules (2 per cart), or if the carts were parked 12 mules (3 per cart). All mules should be provided with pack saddles so as to be available for draft or pack.

We are, after this distribution of ammunition, left with 48 full boxes and 24 mules ; we may then either park the whole of the carts and transfer the whole of the ammunition to packs or, if the carts cannot be parked, we can take 8 mules from the four empty carts and load them with 16 boxes of ammunition from the carts. This, with the 8 mules already loaded, gives us two mules per company to go with the battalion and a further reserve of 32 boxes of ammunition in carts.

By either of these plans we should have a considerable supply of ammunition on pack animals with the troops in action.

To recapitulate :—

The whole on packs would require		55 mules, 19 drivers.
The suggested system	... ...	32 mules, 11 drivers.
The modified plan	... ...	44 mules, 15 drivers.

With the present Martini-Henry ammunition the proportions would be the same but the amounts greater, not only on account of the greater weight, but because less would be carried by the soldier.

IV.—Replenishment during Action.

Ammunition served out before entering action.

As already suggested troops before entering action should be served out with an increased supply of ammunition. This is a point of vital importance, for it is more than doubtful whether any attack could possibly be successful in which troops ran short of ammunition during

the actual advance. This point is insisted on in the regulations of most Continental armies.

When is it possible to replenish the ammunition of the fighting line?

Let us now consider under what circumstances it would be possible to replenish the ammunition of the fighting line. Taking the Franco-Prussian war as the best example of modern warfare we see that a battle consists of a number of local attacks, which, though all part of one general plan, have each their own well-defined objective.

In fact the advance, instead of being one great wave, is made up of a number of little waves, of which some establish their advance in one place, whilst others are rolled back. Frequently an attack is successful locally, but the victorious troops are in their turn forced to retire owing, sometimes, to an insufficiency of ammunition to meet the counter-attack. Thus at the battle of Spicheren the 1st Battalion 39th Regiment, after a victorious advance through the Gifert Forest, found its ammunition failing, and, with "neither support at hand nor the wherewithal to replenish their pouches," were obliged to retire before the vigorous counter-stroke of the enemy. At the same battle, after the capture by the Prussians of the Rotherberg, the position was very nearly lost owing to the failure of ammunition.

In the battle of Viouville we find the Prussian infantry, having forced their way through the Bois de Boulogne, unable to advance further, having almost expended their ammunition. At the same battle we find the infantry obliged to retire through the Trouville copses, having expended their ammunition. It is needless to repeat examples; suffice it to say that most of these battles consisted to a great extent, as far as the infantry were concerned, of local advances and retirements, where one side would seize some well-defined point, such as a wood, copse, hamlet, mill, &c., often to be driven out and again to attack the same point. After such an attack there is generally a slight pause before counter-attack. This opportunity should be seized to reorganise the thoroughly mixed units and to replenish the ammunition.

Any such defined point, whether copse, ridge or other object, will, when once seized, give a certain amount of cover for the advance of the ammunition party. In like manner, if the assault fail, the late assailants will go on retiring until they get some defined object to rally in or behind.

If these deductions be correct the most favorable and necessary moment for replenishing will be immediately after a successful attack (it must be immediately) or as soon as the troops rally after an unsuccessful one.

The manner of replenishment.

After an attack the assailants, whether successful or not, will have plenty to do without sending back for ammunition; besides which the time required for a party to go back, even 400 yards, and bring up ammunition, will probably not be available; there are also other objections to sending any one back from the fighting line.

There should, therefore, be some responsible and intelligent person with the ammunition, who, during the advance, will see that the mules follow the attack as closely as the configuration of the ground will permit. It will seldom happen that cover will be so totally absent that a few mules cannot follow at a distance of, say, 600 yards by picking their way from point to point. As long as mules can follow they should do so; if that becomes impossible as much ammunition must be carried by men as they can carry. It must be remembered that, during the assault, the enemy's attention and fire will be pretty well occupied by the fighting line.

Whilst the result of the assault remains doubtful the ammunition party must remain under cover, though as near as possible to the fighting line. Immediately the assault appears successful the ammunition must be pushed on (without waiting for orders) by the quickest route possible. On arriving at the fighting line the bags are taken to the section leaders, who open them and throw the packets to the men of their sections.

In the event of the assault being unsuccessful the ammunition party must rapidly make for that defined point on which the troops are likely to rally, and must open the boxes and have the bags ready to serve out at once.

The main principles for the ammunition party to act on are :—

Maxims for the ammunition party.

1st.—That, *whenever* opportunity occurs, the ammunition of the soldier must be replenished to the full amount he can carry, *i.e.*, to 140 rounds (if available), although the soldier may only have expended a few rounds.

2nd.—That it is the duty of the ammunition party to find out when replenishment is possible and necessary and not to wait till called upon.

3rd.—That the ammunition party should always keep as near the fighting line as there is cover for them.

The proposed plan of having the ammunition ready packed in bags has the following advantages :—

(*a*) No delay in transferring ammunition from box to bag.

(*b*) There is no sending back the empty bags (for the disadvantages of sending men back from the fighting line *vide* Mayne's Fire Tactics).

(*c*) No inconvenience owing to lost bags.

Constitution of the ammunition party.

The plan of using regimental pioneers as ammunition bearers has some objections.

Their services might be more useful in the advance to help to clear obstacles. Battles consist very largely in the seizure of successive points, such as buildings, which, when seized, should be rapidly rendered defensible towards the enemy's side; for this the skilled labour of the pioneers would be more valuable than as mere carriers.

The ammunition party should have a special commander and one or two specially selected non-commissioned officers. The remainder of the party would require no great training.

It would be advantageous to have this party pretty strong at first; they would act as a guard and would help the movement of the carts by using the spade, pick and axe with which each cart is provided.

As ammunition was replenished they would reinforce the fighting line, joining whatever company they might have taken ammunition to.

On the whole it might not be advisable to take men from each company, because they would get to consider that the ammunition in their charge was the special property of their own company, whereas all ammunition should be available for any company that might require it.

V.—Peace Practice.

To enable the replenishment of ammunition to be practised in peace time the blank cartridges should be done up in packets and the packets in bags as proposed for ball cartridge, though perhaps packets of five cartridges would do instead of packets of ten.

The management of the ammunition mules and bearers requires as much or more attention than the actual serving out of the cartridges.

Ammunition should always be served out just before "forming for attack," and also always after a successful attack or after a retirement, whether it is the intention to carry the exercise further or not. This would habituate the men to rally on these occasions.

It is most desirable that transport of the kind which would be used on service should be available for this practice. If ammunition transport could always be in possession of a regiment the effect would be most valuable. Colonel Luckhardt alludes to the bad state to which the pack animals issued to regiments at the last camp of exercise were quickly reduced; and he appears to consider that it was due to want of appreciation of the value of transport. The 24th P. I., who had been long in possession of regimental transport, marched down from Mian Mir with a large number of pack animals. These animals were in such good condition that they were selected to supply the wants of the head-quarter staff and of others for whom the pick of the transport was considered desirable. Does not this tend to prove that, in the converse case, want of knowledge was to blame?

The present transport classes are a step in the right direction, but knowledge quickly acquired is generally quickly forgotten. If regiments were habitually in possession of a small amount of transport they would take a pride and interest in its welfare, and transport duties would soon be looked upon as a branch of military art. If the transport consisted of ponies instead of mules it might be available for the training of a certain number of men annually as mounted infantry. The regimental transport might be available on indent of the commissariat officer for station duty at large stations, each regiment being detailed in turn for this duty. In this way the increase in the peace establish ment of transport need not be very large.

The saving in war time owing to the better care of the transport would, I believe, amply repay the increased peace expenditure, and the improvement in efficiency would be incalculable.



SOME FURTHER REMARKS ON THE SUPPLY OF AMMUNITION TO GUNS IN ACTION.

By Major James Fox-Brough, K.B., R.H.A.

Since I wrote my former remarks on the supply of ammunition to batteries in action "Letters on Artillery," by Prince Kraft Zu Hohenlohe Ingelfingen, have been translated by Major N. L. Walford, R.A., and published in the proceedings of the Royal Artillery Institution. In the May number the ninth letter has appeared, dealing with renewal of ammunition in time of war.

From it I make the following extracts :—

"On the march batteries never moved in any other formation than that prescribed for rapid marches. A wagon followed every gun, and was under the command of the No. 1. At the rear of the battery marched the store wagon, the field forge, and the baggage wagons (all the wagons connected with the internal economy of the battery), under the command of the quarter-master sergeant. When the battery was about to advance into its position for action the command was given : 'Form lines of wagons.' The guns pushed on as soon as they came within reach of the enemy's fire. The first line of wagons followed close behind them ; this included three ammunition and one store wagon. The second line, that is the six other wagons, were collected from the whole brigade, placed under command of an officer, and posted at some point selected by the officer commanding the brigade. When the battery unlimbered the wagons of the first line took up a position on the left of the guns, on the same front and with the same interval."

From this it might be understood that these three ammunition wagons of the first line remained in action on the left of their guns ; but that such was not the case is shown by the following :—

"So long as the permissible slowness of the fire rendered it possible to do so every shell was to be taken direct from the wagon, *with which object a wagon was posted in rear of No. 2 and another in rear of No. 5 gun.*"

The italics are mine ; and it will be noticed that this position for two of them is precisely what I ventured to suggest it should be in my former remarks on the subject. It certainly seems strange to post these two wagons first on the left of the guns and then, when the guns have been observed and attracted the enemy's fire, to move them along the rear of the battery to the positions assigned them in action. To let them advance in rear of Nos. 2 and 5, and remain there, would seem to be both the simplest and safest plan.

But to proceed : "As soon as a wagon was empty the wounded and also the dead were placed on it (for it is not wise to leave them long in

sight of the battery), and it was allowed to return slowly to the collected second lines of the brigade. The *third wagon of the first line took its place*, and one from the second line was brought up as quickly as possible to the flank of the battery."

Now, as a means towards the renewal of the ammunition or rather to the *perfect* continuance of its supply, the presence of this third wagon on the left flank would appear to be either too little for this object or too much.

One wagon in rear of No. 2 supplies the right half battery with ammunition and one in rear of No. 5, the left.

Presuming that, as the Germans lay down should be done, the fire of all the six guns is continuous and regular the ammunition in these two wagons should be finished within a very short time, the one of the other. Therefore I say too little, because the third wagon cannot then take the place of the two emptied by the fire of the six guns, and I say too much because, if a fresh wagon can be brought up from the second line in place of the second which becomes empty, then surely it would be equally simple for both the fresh wagons to be brought up from that line.

The *Prince* says that the wagon on the left is not exposed to artillery fire and that the German artillery hardly suffered from any wagons being blown up. But surely a wagon placed on the left of the guns must suffer from infantry fire and bullets from shells, which would disable men and horses though not the wagon itself. In fact it is to my mind difficult to discover the advantage of placing the third wagon on the left of the guns, where, as the *Prince* says, it certainly takes up room, which moreover, as at Sedan, could not be provided for it. What is the object of having it, its men and horses, under fire till its ammunition is required for use ?

Also as regards every gun being followed by its wagon on the march, and then, when the battery is about to advance into its position in action, eliminating those of the second line, this must, as I said in my former remarks, cause some confusion at a critical moment. Ably as was the German artillery handled in the war of 1870-71, there must have been times when a battery, arriving with each gun followed by a wagon on the field, found itself under fire, and under such circumstances eliminating a team which may have received a casualty must divert attention from the important matters of a prompt advance into position.

Moreover the second line of wagons when eliminated from their guns must for some minutes at least be in the way of the guns of the next succeeding battery.

Thirdly, as the second lines of wagons are not required with their guns for a continuous supply of ammunition at the outset of an engagement, why not, instead of brigading them after arriving on the field and when most likely they will be under fire, let them be brigaded on the march ? They could then follow in rear of the rear battery.

Two extracts, which I shall quote here, would seem to account for Prince Hohenlohe's nervousness about separating wagons from their batteries. They are :—

"Thus an unfortunate *N.-C. officer* in charge of a line of wagons may find himself with his three or four wagons treated by a cavalry or infantry regiment, *if he gets in the way*, as so much train which has no business there, and will thus be hustled into the ditch."

And again: "The commander of the lines of wagons, a N.-C. officer, or even sometimes *an old soldier*. * * *"

Both being apparently relative to his experiences in the war of 1866; and small wonder that an objection arose to a system which placed lines of wagons in charge of a N.-C. officer, much less of "an old soldier."

When wagons are detached from their guns in the British service the rule is that the captain of the battery is to be placed in charge of them. Such an officer would neither be likely to get them "in the way" of other troops or allow his charge to be hustled into a ditch. But what is a far more important argument is this: I do not believe that there is a single commanding officer of a British cavalry, or infantry, or Native cavalry, or infantry, regiment who would desire to do such a thing as hustle ammunition wagons following batteries to the scene of action off the road. There is no officer of standing and position in our army who does not know how necessary artillery fire is at the outset of a battle and that without ammunition the artillery cannot pretend to pave the way for the advance of his particular regiment, whether it be horse or foot.

When we read dissertations on what German artillery authorities now profess we must not lose sight of one well-known fact, which is that, during the Franco-German war of 1870-71, the German artillery—splendid service though it now is and as it then proved itself to be—had a reputation to make. It made it, but that is no argument why we should accept its every "fad" as sound and past questioning.

To my mind placing the third wagon on the left of its guns, or bringing it up at all into the fighting line till its ammunition is wanted, is a "fad," and also to my limited vision the attaching of a wagon on the march to each gun is another "fad."

One of the points which the German artillery do lay stress on is the necessity of columns of artillery advancing as quickly as possible to the scene of action. Now the shorter a column of guns, with their *absolutely necessary* wagons, is from front to rear, the less time will such an advance along any road take. Every wagon added which is not required at the opening of the action is a wagon in the way of such a rapid advance, and it is, moreover, an additional possibility of an accident either on the march or on reaching the battle field interfering with the guns in rear of it.

Anent the matter of rapidity of marching there are a few remarks to end with. I shall put them in the shape of questions and answers. These questions and answers refer, I may state, to a battery of horse artillery armed with the 9-pr. R. M. L. guns as in India at present.

1.—Q. What is the weight of the shafts of a gun limber in marching order *before* the two limber gunners mount?

A. Ninety-four pounds.

2.—Q. What is the weight *after* they mount ?
A. One hundred and eight pounds.
3.—Q. Supposing that, instead of the two limber gunners mounting on the limber, they sit back to back on the *trail*, what is the weight of the shafts then ?
A. Seventy-five pounds.
4.—Q. Lastly, if the two limber gunners sit on the axle-tree boxes, what is then the weight of the shafts ?
A. Ninety-four pounds, the same as answer to Q. 1.

Remarks :—

We have no seats on the trail, and the position indicated in Q. 2 is that recognised. Now it will be observed that, if we had seats on the trail, the weight on the shaft horse's back would be *decreased* by 19 pounds by the two men seating themselves on them, that being the difference between 94 pounds and 75 pounds.

We have axle-tree seats ; but it will be seen that placing the two men on them does not affect the weight of the shafts.

5.—Q. What is the weight of the shafts of a wagon in marching order *before* the two gunners mount on the limber ?
A. Eighty-six pounds.
6.—Q. And *after* they have mounted ?
A. One hundred pounds.
7.—Q. Supposing the two gunners to sit back to back on the *perch* instead of on the limber, what would the weight of the shafts be then ?
A. Sixty pounds.

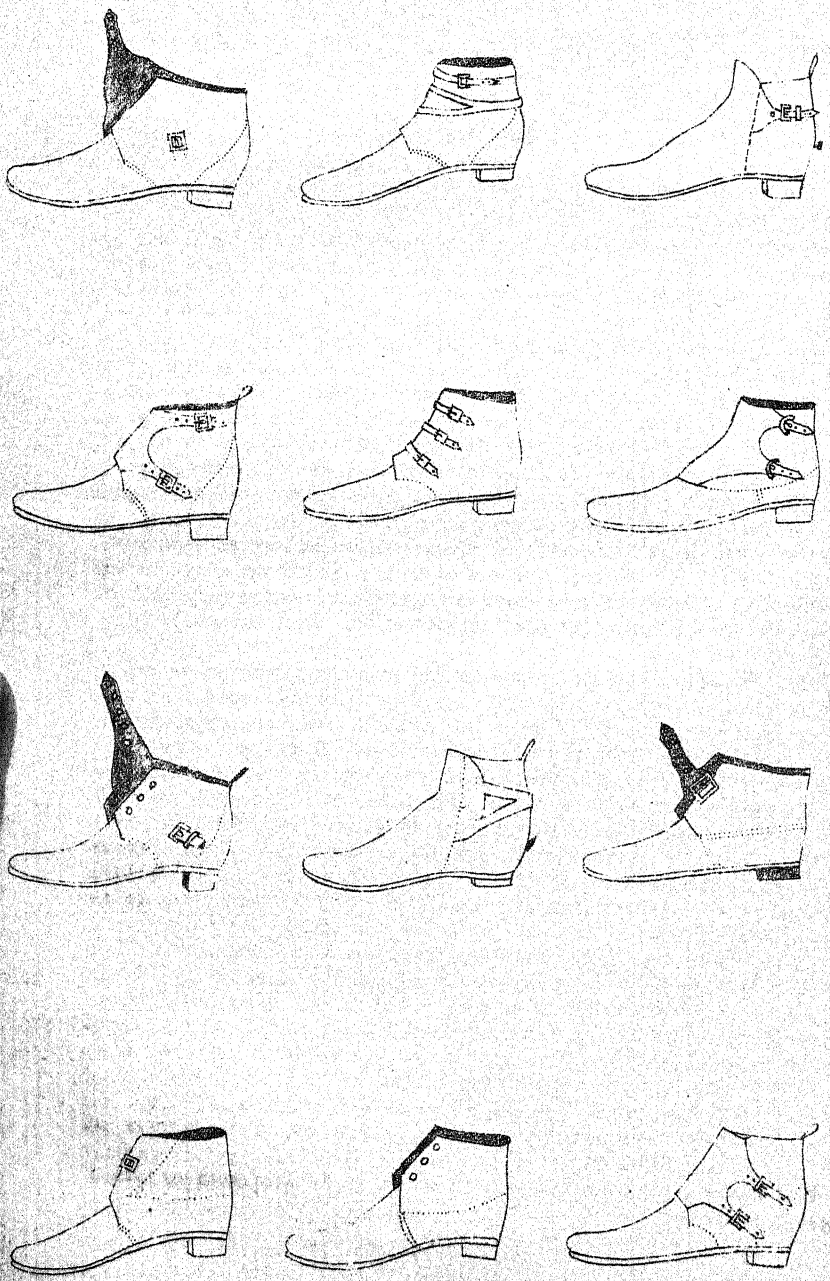
Remarks :—

We have no seats on the perch. If we had, by seating the two men on them, the weight of the shafts would be *reduced* by 26 pounds, or the difference between 86 pounds and 60 pounds.

The Germans are apparently introducing seats on the trail. Let us do the same, and in addition provide similar seats on the perch of each wagon ; and, instead of carrying men on the limbers *on the march*, let them be carried on such seats. As soon as a battery deploys on the battle field then let these men take their seats on the limber boxes, as that position is the safer in case of a carriage upsetting.

But the lessening of the weight of the shafts on the march by from 20 to 25 pounds would prove a great saving to the shaft horses of both gun and wagon.

SPECIMENS OF BOOTS AT PRESENT WORN IN THE NATIVE ARMY.



BOOTS FOR THE NATIVE ARMY.

By G. B. A.

Cavalry Boots.

Generally speaking the knee boot at present worn by the Bengal Cavalry is of the Napoleon pattern, while the cavalry of the Madras and Bombay Presidencies prefer the lower cut "Hessian" or "Butcher" boot. But, whatever the pattern, there is always great difficulty in getting a native cavalryman's knee boot to fit well. Almost invariably the dimensions of the calf of a native of this country are smaller than those of the instep measured round the heel; in consequence a knee boot made to fit him round the calf will be too narrow to allow of his getting his foot with its protruding heel into the boot at all. And here it may be as well to state at once that, on *active service*, knee boots are not required at all by native cavalry; as far as can be ascertained, ankle boots with putties have always been found to answer much better. It is then with knee boots for parade purposes that we are chiefly concerned; and what I propose doing is to review as shortly as possible a few of the patterns at present in use, or that have been tried, pointing out what appear to be their advantages and their defects.

The *Napoleon* pattern is preferred by many regiments as being of the simplest construction; but it exemplifies perhaps more than any other boot the difficulty there is in fitting a native cavalryman well. The legs of the boot are always much too large for the calf of the wearer; and, as a consequence, after having been in wear some time, almost invariably begin to sink down the leg, presenting an ugly, bulgy appearance. Again, if the legs are made of stiff solid leather, so as to prevent their sinking in the manner described, there is a danger of their being rendered too heavy and clumsy. Napoleon boots are most unsuited to dismounted duty, and are very difficult to get on and off.

The *Combination Gaiter* or *Tipping* boot has found favor with some regiments. It is, as its name implies, a stiff gaiter strapped to an ankle boot (Figures I & II) in such a way as to have the appearance of a knee boot. Briefly described, the advantages claimed for it are the following:—

(1). It can be made to fit a native well.
(2). It is suited for both mounted and dismounted duty.
(3). Being in two parts, it is not subject to the disadvantages of an ordinary knee boot.

Undeniably it is a smart-looking boot, but the disadvantages urged against it are—

(1). That it is not simple enough in construction.
(2). That it takes a long time to put on.

The latter objection particularly is considered by many to condemn the boot.

The *Modified Elcho* pattern (Figure III) is very like the ordinary Elcho shooting boot, except that, instead of being laced nearly all the way up, it is only laced a third of the way up, the upper part being buckled instead of laced. This modification is intended, of course, to simplify and shorten the process of putting on the boot, for, as is well known, the native soldier is a very bad hand at lacing. The advantages claimed for the boot are—

(1). It is suited for both mounted and dismounted duty.
(2). Although not stiff, like an ordinary knee boot, it is perfectly water-tight.
(3). It is more suited to a native soldier than the ordinary Elcho boot.

But, on the other hand, several objections are urged against it :—

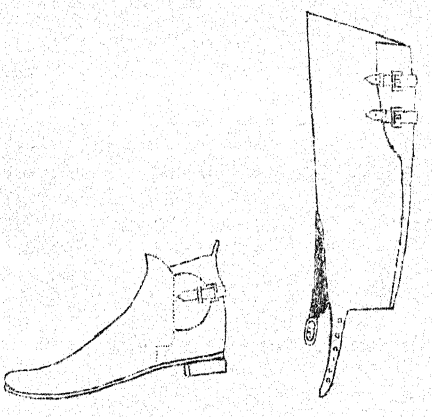
(1). The leather being soft is sure to crease and sink in wear and spoil the appearance of the boot.
(2). The lacing is liable to come undone, and possibly, by catching in the stirrup, impede the wearer when in the saddle.
(3). The buckles of the upper part are likely to get knocked off by friction in the ranks, and when once they give way there is no means of securing the flap.
(4). The elaborate water-tight tongue arrangement is not desirable in a sowar's boot, simplicity of construction being most necessary.

There can, in my opinion, be no doubt that this pattern is *not* suitable for native cavalry.

We now come to the *Hessian* or *British Cavalry* knee boot. This pattern (formerly "square-cut" instead of "V-cut") was the regulation British cavalry boot for a long time, and while perfectly light and serviceable in other respects, had, in common with ordinary riding boots, the one defect of being difficult to get on and off when damp. This defect the Pimlico authorities have quite recently remedied by the insertion of a gusset, about three inches long, in the instep or "throat" of the boot, which eases the tightness of the boot in the very part that caused the difficulty of getting it on and off. This gusset is rendered water-tight by a simple calf-skin tongue fastened on the inside, and when the boot has been put on, is laced up by five eyelets inserted on each side, the whole being afterwards covered and hid from view by a broad spur-strap. This improved pattern (Figure IX) knee boot no doubt meets the requirements of British cavalry perfectly; and, in my opinion, it is also the best for native cavalry. I will give briefly my reasons for thinking it on the whole better suited to the requirements of native cavalry than any other pattern :—

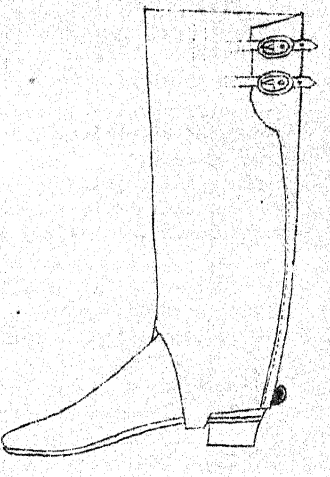
(1). It is perfectly simple in construction.

FIG. I.



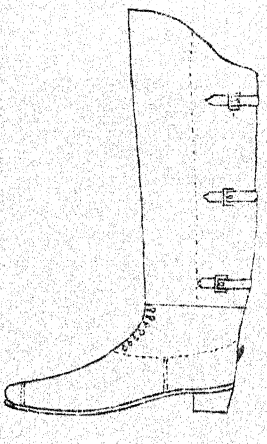
The Tipping Boot and Gaiter-detached.

FIG. II



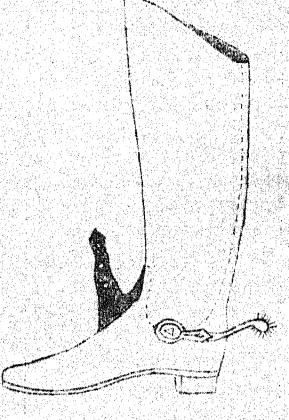
The Tipping Boot and Gaiter-as worn

FIG. III.



The modified Elcho Boot.

FIG. IV.



The Nicolson Boot.

SPECIMENS OF SHOES WORN IN THE NATIVE ARMY.

NATIVE PATTERNS.



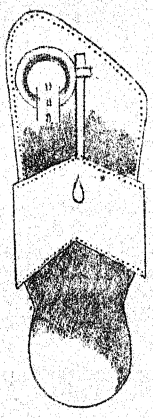
Punjabi.



Goorgabi.



Moonda.



Chuppal.

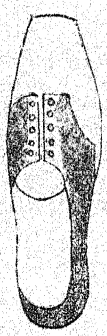


Hindustani.

EUROPEAN PATTERNS.



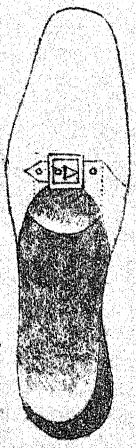
Mohere.



Highland.



Oxford.



Buckle.

(2). It is lighter and more serviceable than the long heavy Napoleon boot.

(3). The opening of the gusset to a certain extent enables the leg of the boot to be made so as to fit more closely round the calf.

(4). The misfits which the protruding heel of the native soldier often render inevitable are not so glaringly noticeable as in the case of a Napoleon boot.

(5). The boot from its very shape is always fairly smart-looking.

(6). The gusset allows a certain amount of play to the ankle when the wearer of the boot is dismounted.

(7). The boots are got on and off without difficulty.

In this connection it may be as well to mention the *Nicolson* boot (Figure IV), which is on exactly the same principle as the British cavalry pattern, except that the opening at the instep or "throat" is closed by a flap or buckle instead of a laced gusset. In my opinion the gusset is infinitely preferable, because the flap of the Nicolson boot does not lie smoothly, and is rather inclined to bulge, while the buckle (which is much larger than a spur-strap buckle) is in a minor degree open to the same objection that was urged against the buckles on the upper part of the Modified Elcho boot. At the same time it must be admitted that the idea of one strap and buckle serving for both the opening at the "throat" and the attachment of the spur is a very ingenious one.

The idea that mainly strikes one in considering the numerous ingenious patterns (of which I have noticed only a few) that have been devised to meet the peculiar requirements of Native cavalry, is that the defects that can be urged against boots of complicated construction always more than counterbalance the advantages to secure which they were invented, and the conclusion seems to be that it is best to adopt that pattern against which the fewest objections can be urged.

Ankle Boots.

It was observed at the Delhi "march-past" last year that the sepoy wearing native shoes experienced some difficulty in marching through mud that was six inches deep. Thereupon a howl was raised about the unsuitableness of the native shoe as a part of the native foot-soldier's equipment. But to condemn the ordinary native shoe is a great mistake. For marching on dry level ground no form of shoe or boot is as good; and native regiments equipped with the native shoe will, in the plains of India, cover ground in shorter time than any troops in the world. On the other hand, for swampy or rocky ground, the ankle boot is equally indispensable. The sepoy, therefore, if he is to be equipped so as to march with facility over any kind of ground, must have both boot and shoe. The most natural solution of the difficulty would be to devise a kind of shoe that would combine the advantages of both. But the two things are so different that this is, in my opinion, quite impossible. The light native shoe with its flat heel and curved bottom is peculiarly adapted to the comparatively shuffling step of the

native, who does not lift his foot in marching nearly as much as a European. It will no doubt often have been observed that a native, when he marches in boots (which are *flat-bottomed*), on level ground, always wears them out first at the toe of the sole ; from this the virtue of the curved sole of the native shoe will at once be appreciated (Figure V). But, as Colonel Babington has rightly pointed out in his pamphlet entitled *A Boot and a Shoe for the Native Army*, the defects of the ordinary native shoe are—

(1). That it affords no protection from thorns, &c., to the upper part of the foot.

(2). That it allows small stones and sand to work in from above and hurt the foot.

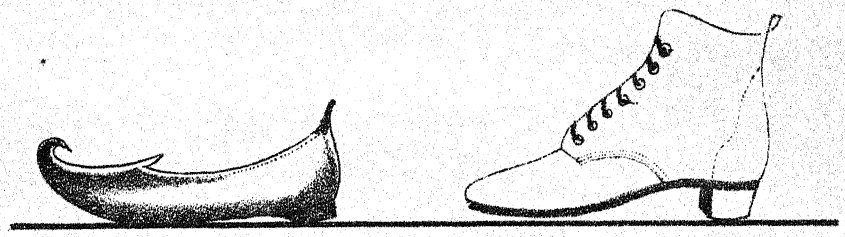
(3). That it cannot be kept on the foot when marching over heavy or swampy ground.

There is a kind of native shoe (Figure VII) sometimes worn by villagers in low-lying and swampy districts, which is designed to obviate all these disadvantages. But the broad flap by which this is effected is very ugly, and the shoe would never be adopted for military purposes. Nor, it must be confessed, does the combined boot and shoe (Figure VI) which Colonel Babington has devised, altogether meet the case. It is not so much that the invention is not all it claims to be as that it labours under the disadvantage of being "neither one thing nor the other." The attachment of the upper and the change* of the shape of the heel and bottom take away many of the advantages of the native shoe ; while we are given instead an ugly boot, not well constructed, and being moreover neither as strong nor as durable as an ordinary Army boot. Colonel Babington has shown a clear appreciation of the difficulties of the case, and has made an honest endeavour to meet them ; but he has, I fear, attempted an impossible task.

If, then, the sepoy is to have both boots and shoes, the great thing to arrive at is the adoption of the most suitable kinds. Let the style of the native shoe be that to which each regiment is accustomed, whether Punjabi, Hindustani, Goorgabi, Moonda, or any other pattern. The "Punjabi" appears to be the most generally worn at present, and it is that pattern alone, I believe, that the Commissariat Department issues for the use of camp-followers all over India. But whether it might be universally adopted is another matter, and I do not think that regiments that are composed of men who do not like the pattern should be forced to wear it. At any rate the colour and make of the Punjabi shoe might with advantage be made uniform in all regiments, as it would facilitate the transfer of excess stocks of shoes from one regiment to another. The best and most serviceable colour is the ordinary buff with red edging, such as is supplied to camp-followers. For the rest, the present shapes and styles of make of the different patterns are perfectly suitable, and all that is necessary is to see that the shoes are made strongly and well. Do not cut down the contractor who supplies

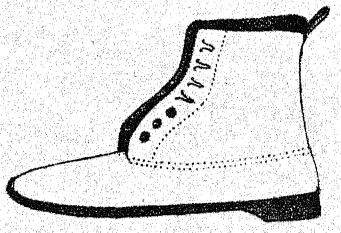
*I am referring to Colonel Babington's latest and improved pattern.

FIG. V.



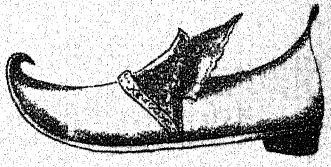
Sketch illustrating the difference between the soles of a Native Shoe and a European Boot.

FIG. VI.



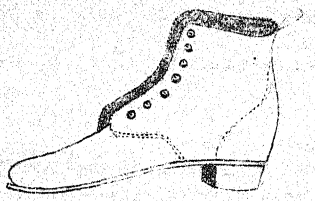
The Babington Shoe.

FIG. VII.

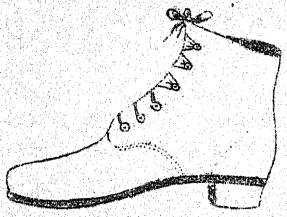


The "Flapped" Native Shoe.

FIG. VIII.

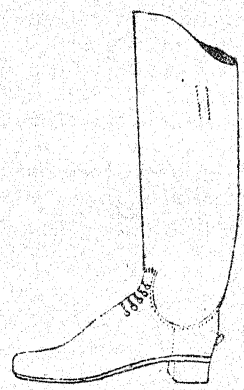


The British Army Laced, Ankle Boot.



Same pattern as above, with hooks for the Native Army.

FIG. IX



The British Army regulation Knee Boot, proposed as the Regulation pattern for the Native Army.

FIG. X.



The shape of the Native Foot.



The shape of the European Foot, as distorted by wearing Boots with pointed toes.

them too low in price, or he is sure to make them of rubbish that will not last.

Great care should, however, be taken to see that *comfortable* ankle boots are supplied to the sepoy. It must be remembered that, while a British soldier has been accustomed to boots from childhood, and regards them as an indispensable covering to his feet, the native soldier—except perhaps the Goorkha, who apparently is very fond of his boots—probably never wore boots at all before he joined his regiment, and however proud he may be of them, regards them much more as a part of his equipment, on which the "Sircar" insists, than as connected with his personal comfort. Broad-toed boots that will not cramp the feet (Figure X), with low broad heels, should always be obtained in spite of the shoemaker, who naturally prefers to supply a narrow-made boot with pointed toes, because it does not take so much leather to make it. The following extract from a letter which was written a short time ago by Colonel Wynch, Commandant of the 22nd Madras Infantry, will illustrate the importance of shape in a sepoy's boot :—

It affords me much pleasure to inform you that my regiment marched a distance of 433 miles within the last 12 months, and we found that but few men fell out from "shoe-bite."

* * * * * *

I insist upon having my boots cut straight on the inside, with broad toes, as Professor Hermann advocates. The toes of the natural foot are straight with or parallel to the line through the foot's centre. See the foot of a native of this country, whose feet have never become deformed by having worn the cut away or pointed English boot, while the toes of the majority of Englishmen are drawn to an angle, the result of the boots being cut away in the inside to a point to look, as some people think, pretty.

Socks—when a regiment can afford it—add greatly to the comfort of a sepoy when wearing boots ; they should be made as thick as possible.

Reference was made in the first part of this article to the fact that boots worn by natives generally wear out first in the toe of the sole : this can be remedied by attaching an iron toe-plate to that part of the sole, though of course this makes the boot somewhat heavier. Again, in the hills, the sole can be further protected by the use of hob-nails, which should be carefully and firmly put in ; but large carpenters' *screws* are not recommended. The heels should always be protected by iron plates—known as "heel-tips"—and for wear in the hills it will be found better to have these screwed on instead of nailed. The back-strap or tag which Europeans use in pulling on their boots is not used much by natives, and it may be found tidier to dispense with it altogether.

We now come to the question of the most suitable pattern of ankle boot for natives. I do not propose reviewing the different patterns at present in use, because they are so numerous, and many of them so bad, that no advantage would be gained by discussing them. It will be enough to state at once that the ordinary laced ankle boot of the British Army pattern (Figure VIII) is *by far* the best. Its con-

struction is infinitely more suited to marching purposes than any other boot that has ever been invented. Perhaps it will be instructive to mention in this connection that the American and all the Continental armies (except the Italian army, who wear laced shoes* very like our Highland shoe) wear this boot. There is, I am aware, a very general prejudice in the native army in favour of buckled boots; this is not at all unnatural, because buckles and straps are much more easily and rapidly fastened than laces. A native soldier, who has very often to turn out in the early mornings, cannot be expected to pass the ends of his laces through the laceholes without some difficulty when he has to feel for them in the dark. The remedy for this is, however, very simple, and is already finding favour in the native army; it is the substitution of hooks for the three upper lace-holes of the boot, as it is generally only through these three upper holes that the laces have to be passed when putting on or taking off the boot. The only reason why British soldiers do not have hooks to their boots is because it is thought they would rub against and wear out their tight trousers or "overalls." At any time, it must be admitted, there seems to be some difficulty in getting the native soldier to lace his boots *neatly*; but this, surely, is a defect that will disappear as he gets more familiar with lace boots. It has come under my notice that several regiments who used formerly to take buckle boots have since adopted lace boots, which proves that the latter kind is gaining in popularity. Indeed, there can be no question about the comparative merits of the two patterns; the best of buckled boots are vastly inferior to the laced boot in point of construction, and do not give nearly as much support to the foot, added to which they never fit so well round the ankle. Any form of fastening, especially a buckle, is inferior to lacing, simply because it is liable to break and give way, especially on active service, thereby rendering the boot unserviceable. Lacing, on the other hand, is always efficient, because, even if the lace breaks, another can be easily substituted in its place. The sepoy should always have an extra pair of laces with him.

For cavalry regiments I recommend exactly the same kind of ankle boot, cut, if preferred, a little higher, so as to fit well under the puttie. The lacing can be covered by a broad spur-strap, as in the case of the gusset of the knee boot. British cavalry always wear their ordinary lace ankle boots with putties on active service. The buckled boot with blocked front, which some Bengal cavalry regiments wear, is quite unnecessary; it is not a good boot for dismounted work, and does not fit well round the ankle.

Summary.

It will have been gathered from the foregoing remarks that the conclusions to which I have come are that the regulation boots of the native army, both cavalry and infantry, should be of the same pattern

* I do not recommend laced shoes of the Highland or Oxford pattern, because while they are nearly as heavy as boots, they afford no protection or support to the ankle.

as those at present used in the British army. The British army has been accustomed to fighting under all circumstances of soil and climate. And now that the native army is no longer a local force, but goes "across the black water" to Egypt or Burma, it is not unreasonable to conclude that the kind of boot that has been proved to suit the British army best will also be found to be the best for the native army.

The present regulation "kit" of the British Army is as follows :—

British Cavalry—Knee boots	1	pair.
*Wellington boots ...	1	,,
Ankle boots, ordinary lace pattern	1	,,
British Infantry—Ankle boots, ordinary lace pattern	2	pairs.

It is proposed that the native army should have :—

Native Cavalry—Knee boots, of British army pattern	1	pair.
Ankle boots, of British army pattern	1	,,
Native shoes, according to custom of regiment	1	,,
Native Infantry—Ankle boots, of British army pattern	1	,,
Native shoes, according to custom of regiment	1	,,

APPENDIX.

GUIDE FOR ORDERING BOOTS.

Scale showing proportion of sizes in 100 pairs usually required by H. M.'s Native Army.

Bengal Infantry.

5 Size.	2 Pairs.
6 ,,	12 ,,
7 ,,	24 ,,
8 ,,	29 ,,
9 ,,	20 ,,
10 ,,	10 ,,
11 ,,	3 ,,
100 Pairs.	

Bengal Cavalry.

6 Size.	8 Pairs.
7 ,,	22 ,,
8 ,,	30 ,,
9 ,,	23 ,,
10 ,,	12 ,,
11 ,,	4 ,,
12 ,,	1 ,,
100 Pairs.	

Goorkhas.

4 Size.	2 Pairs.
5 ,,	16 ,,
6 ,,	40 ,,
7 ,,	30 ,,
8 ,,	10 ,,
9 ,,	2 ,,
10 ,,	0 ,,
100 Pairs.	

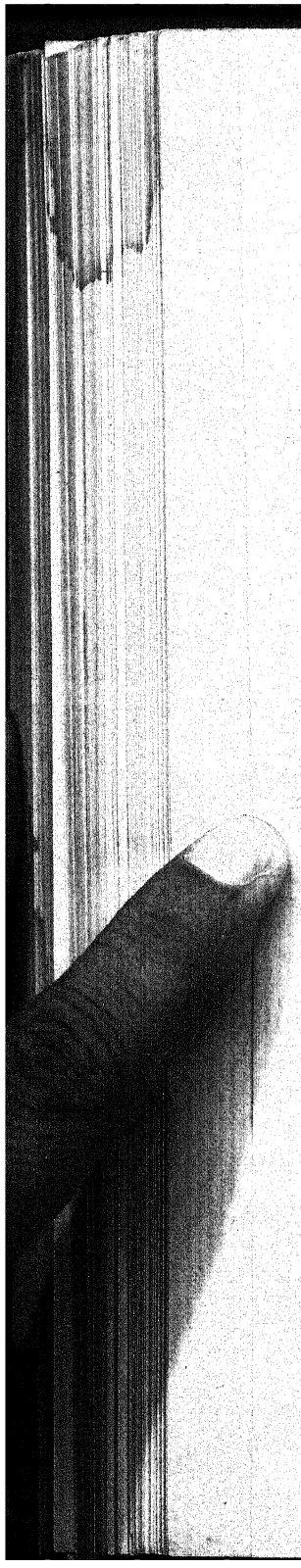
Madras Army.

5 Size.	2 Pairs.
6 ,,	10 ,,
7 ,,	26 ,,
8 ,,	34 ,,
9 ,,	19 ,,
10 ,,	8 ,,
11 ,,	1 ,,
100 Pairs.	

Bombay Army.

5 Size.	2 Pairs.
6 ,,	8 ,,
7 ,,	24 ,,
8 ,,	36 ,,
9 ,,	21 ,,
10 ,,	8 ,,
11 ,,	1 ,,
100 Pairs.	

*Not used on active service.



[*Published with the permission of the Adjutant-General in India.*]

CALCUTTA MOUNTED RIFLES CHART AND COMPASS COMPETITION.

From MAJOR J. A. BOURDILLON, *Commanding Calcutta Mounted Rifles, to* COLONEL F. W. CHATTERTON, *Commanding Calcutta Volunteers,—dated Calcutta, the 2nd April*, 1887.

SIR,—In accordance with the orders of the officer commanding the district I have now the honor to forward herewith to you, for submission to him, a short report on the competition, popularly known as the "Chart and Compass" Competition, which took place on the 27th February last among the members of the Calcutta Mounted Rifles.

2. The intention of the competition was to represent as nearly as possible the conditions under which despatches are carried through a strange and hostile country, and to award a prize to the volunteer who carried out his allotted task with the greatest intelligence and rapidity.

3. In furtherance of this scheme the donors of the prize—three mercantile gentlemen of Calcutta—selected a piece of country several miles from Calcutta (the locality of the meet being kept a profound secret), where every arrangement was made beforehand. The competition was restricted to efficient volunteers, who had to ride their own *boná fide* chargers.

4. On the appointed day thirteen volunteer troopers started, each provided with a watch and compass. They were despatched in pairs in succession, at ten minutes' interval, from a central point, and before starting each was presented with a sealed envelope containing a map of the country and a paper of instruction. Copies of these are appended for information, but briefly it may be stated that each man had to visit three posts which were marked on the map, at each of which he received a ticket. Between these posts each man had to find his way as best he could, and whoever went round the course in the quickest time was to win the prize. Certain roads and lines of railway were placed out of bounds and were supposed to be held by the enemy, and therefore to be unapproachable.

5. The distance was some 12 miles as the crow flies, but, inasmuch as the whole country is much broken up with groves of trees and large swamps, no one could have covered less than 15 miles in doing the course, and many went very much further. The prize was won by Sergeant Rivers Currie, who did the whole distance in the capital time of one hour and 46½ minutes; five others did the course under three hours; three were disqualified or taken prisoner; and the remainder came in between three and four hours after starting.

6. I append three reports selected from those submitted by the competitors. They are not very full or complete, which is accounted for by the fact that the competitors were not aware, till just before starting, that a report would be required of them, and most of them were unprovided with pencil and paper.

7. The competition was, in the opinion of all present, a most successful one. Too much credit cannot be given to the public-spirited gentlemen who conceived the idea and organised all its details, and its successful issue speaks well, I think, for the intelligence of the volunteers who took part in it. It was by no means a competition for speed or horsemanship alone, but success demanded, in addition to intelligence, a knowledge of map-reading and an eye for country: all these are qualities which it should be the aim of all officers, regular or auxiliary, to develop in their men, and I have no doubt that you will agree with me in thinking that it would hardly be possible to conceive a scheme more practical, workmanlike and sensible, whether for regulars or volunteers.

CONDITIONS.

1. First prize, Rs. 400; second prize, Rs. 100.
2. Efficients only to compete on their own horses.
3. Troop horses only. Any one objecting to a horse must do so prior to the start, and the point will be finally determined by the senior officer present.
4. Courses to be fixed by the givers of the prizes.
5. Each course will be marked on a chart and placed in a sealed envelope with a number on it.
6. Each competitor will draw a number which will correspond with a number on a sealed envelope. He will have to ride the course and conform to the instructions contained in the envelope. If any time allowance is marked on the instructions he will get this deducted.
7. Omitting to do any portion of the orders in the sealed envelope will be a bar to winning.
8. As the competition is a time one the men may be started at intervals.
9. Each rider will bring his own compass.
10. The rider may use his knowledge of the language to make any enquiry he likes, but villagers may have instructions to give wrong information.
11. Any rider seen to use a road held by the enemy and identified by two witnesses will be considered as shot.
12. Competition to be on a Sunday in February, as early as a good working piece of country can be found, probably 13th or 20th.
13. The course will be about 10 to 15 miles, so that speed will not be everything in the competition.
14. Three days' notice by postcard will be given to those who enter on the day fixed for the ride, and place of meeting will be posted at head-quarters on the evening before at 5 P.M.

15. Arrivals at starting post after 6 A.M. will not be allowed to compete.

16. Entries must be made on or before 24th January.

17. Uniform not compulsory.

CHART AND COMPASS COMPETITION.

27th February, 1887.

The meet is at the Chandipur Station on the Bengal Central line, eleven miles from Sealdah.

A special train will leave Sealdah Station at 5-45 A.M. Competitors will take their tickets for Chandipur.

This special train having been arranged, clause 15 of the original programme is cancelled.

In the train competitors will draw in order to fix the rotation of their starting, which will commence immediately after the arrival of the train at Chandipur.

Each competitor must be ready to start when ordered, and will receive a packet of instructions corresponding with his starting number. When ordered he shall open the packet and read these instructions.

Ten minutes allowed for studying them. Thereafter he will be taken to the starting point and despatched by the timekeeper.

Horses can be sent to Chandipur Station on Saturday afternoon with blankets for horse and syce, picketing arrangements and 24 hours' food, or they can be walked out on the morning of the competition. Chandipur Station is reached by going through Dum-Dum in the Barasset direction till the cross pucca road is reached. If a competitor's horse is not on the ground when his turn comes to start he will be disqualified.

Breakfast will be provided for the competitors somewhere near the finish.

Bring a change of clothes with you.

RIDING INSTRUCTIONS FOR No. 8.

This paper of instructions and accompanying map must be shown to no one till after your return from the competition.

You must not speak to any European on the way except the men at the posts, but you may get what information you can from natives.

Don't drown yourself in a jheel. If you think you must cross one enter and proceed with caution; choose a cow track if possible.

Don't override your horse, particularly in rough, uneven or heavy ground. The way is long.

The pucca road between the starting post and Sodepore (marked in blue on the map) is held by the enemy, except ¼ mile at the starting post and the same distance at Sodepore Station.

The pucca road from ¼ mile west of Beerathu Station on the Central Bengal Railway (marked in blue on the map) is also held by the enemy.

At the points marked on the map—× 1 (red), × 2 (red), × 3 (red)—you will find men with flags, who will give you a despatch to hand to the timekeeper on your return. The non-delivery of any one of the three will cause your disqualification.

You will go to point × 1 first, then × 2, then × 3, and finish over the bridge you started from.

You must not cross the Eastern Bengal Railway (Calcutta to Barrackpore), but you may cross the Bengal Central line if you like. You are not expected to cross the khal. If you do so be cautious, as we have not explored the bottom.

The Central Bengal Railway is marked approximately on the map with a double red line.

You have an allowance of time of 15 minutes.

× 1 (red) on the map is the junction of the three roads between Bundeepore and Doperiah.

× 2 (red) on the map is at the Sodepore Station level crossing.

× 3 (red) on the map is the north-east corner of the big tank at Numta.

Start and finish is the bridge over the khal.

Breakfast at 12, so hurry up.

Memorandum of Country and Roads lying between E. B. S. Railway on the West, the Khal on the East, Bundeepore on the North, and Numta on the South.

On leaving the bridge over the khal on the Chandipur and Sodepore road, finding that the enemy were posted half a mile in advance on the road, I turned short off to the left and headed for Angapore.

The route I took was not possible for artillery, the lanes being too narrow.

Artillery would have to be taken over the Central Bengal Railway at Chandipur Station and down the main road (from Dum-Dum to Baraset), recrossing the railway at Beerathu, and so to Numta. In crossing the open to Numta it would be necessary to exercise caution as the country is very wet. By making a slight detour to the north and then to the west a good road would be found.

The tank at Numta is a good place for artillery to be posted as the guns could from here bombard the enemy's position on the Ballgurriah and Goureepore road. The open country round, except on the east and south, is practicable for the movements of cavalry, and the guns could be placed well under cover near the tank.

The lanes are good from Numta to Sodepore. To avoid the possibility of coming on to the Chandipur and Sodepore road (where held by the enemy) I made for the Eastern Bengal State Railway, nearly opposite Cook's stables, and then followed the line up to Sodepore.

Artillery could be taken up to near Sodepore Station, but it would be difficult to get them on the Sodepore road without coming across the enemy, who hold the road to within half a mile of the station.

The country from Numta to Sodepore is for the most part dry, and offers no obstacles to infantry or cavalry.

The road from Sodepore to Bundeepore is good, and is sheltered on both sides by jungle.

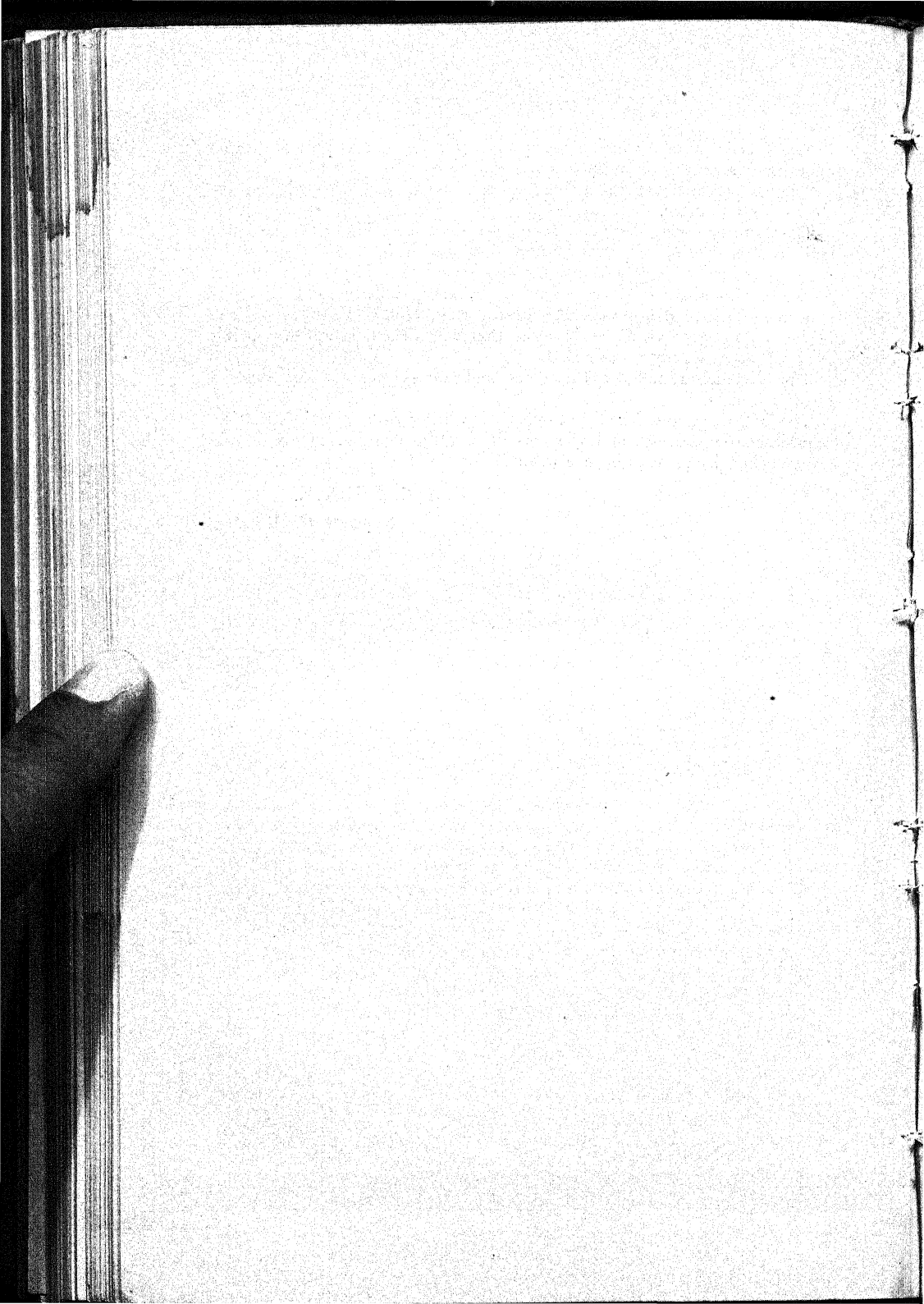
The country lying between Bundeepore and the bridge over the khal, and in fact nearly all the country just north of the Sodepore and Chandipur road, is very wet, and for the most part impassable. Good lanes are found from Bundeepore to Kurnah, thence to Madhobpur and on to the khal opposite Paenarah, then along the khal to the bridge. Artillery could be brought this way without in any way being exposed to the enemy on the road.

The distance round by the lanes and across open country must be about 15 miles.

The villagers are for the most part willing to impart information regarding the country and the position of the villages. Only on one occasion had I reason to believe wrong information was given me.

RIVERS E. CURRIE,

Sergeant, C. M. R.



MOUNTED INFANTRY EQUIPMENT.

By Lieut. A. C. Yate, 29*th Bombay Infantry*.

As the basis of the remarks I have to make on the equipment of mounted infantry I take the "Regulations for Mounted Infantry" issued on 1st September, 1884.

The dress and equipment of mounted infantry are laid down on pp. 32—34 of the Regulations. They may be considered open to modification, at any rate, for active service.

I.—For instance, as regards officers—

(*a*) Ankle boots and puttees are better than high boots. A spare pair of boots is almost a necessity, and a pair of ankle boots is easier to carry than a pair of high boots. Ankle boots are more easily put on and taken off. Puttees (flannel) are perfectly comfortable when dry, and when wet keep the leg warm, whereas leather and canvas when wet afford no warmth.

(*b*) Gloves—superfluous on service, except warm woollen gloves, as a protection from cold.

(*c*) The *numnah*, at least on service, should be replaced by a blanket, which can be used for the comfort of either the rider or the horse, as may be advisable.

(*d*) On service a breast-plate may be dispensed with or, in the case of horses that require it, replaced by a running martingale.

(*e*) Every officer should have a pair of saddle bags attached to his saddle. Officers, like the men, must be prepared to move without transport for a week. In their wallets, havresack and saddle-bags, or strapped inside their cloak or blanket, they must carry their rations and spare articles of dress.

(*f*) The cloak used should be the Regulation black waterproof cape, long enough to fall below the knee when the wearer is seated on horseback.

(*g*) In addition to the articles mentioned in the regulations each officer should carry a prismatic compass, field-book, protractor, one or two hard drawing pencils, compasses and, if possible, a small sketch-book.

II.—As regards the N.-C. officers and privates—

(*a*) Puttees are better than gaiters. See I (*a*).

(*b*) The bandolier has many faults. It oppresses the chest. That is not to be wondered at considering that the weight of 50 Martini-Henry cartridges is about 6lbs. 10ozs. and of 50 Snider about 7lbs. 4ozs. The leather stretches in time,

and the cartridges frequently fall out. The bandolier is adjusted to the waist-belt by a strap, which has to be undone before the bandolier can be worked round. In process of working round the bandolier often catches in the shoulder-strap. The cartridges in a bandolier soon become battered and unserviceable. With all these disadvantages, however, the bandolier is, up to the present time, the best medium of carrying ammunition that has been invented for mounted infantry.

(*c*) Under ordinary circumstances the rifle should be the weapon of mounted infantry. At the same time the carbine was found to be preferable in Upper Burma. It all depends whether the fighting is to be at long or short ranges. Whether the rifle or carbine is to be carried in a bucket or sling can only be decided by putting each method to a thorough practical test. The Gordon bucket has been lately tried in Burma, with what result is not publicly known. A carbine sling invented by Captain Massy was, it is believed, issued last year for trial in the 19th Bengal Lancers. Result of trial also unknown. A good sling is preferable to a bucket for mounted infantry.

(*d*) For close-quarter work and general utility the sword-bayonet appears to be the best existing weapon for mounted infantry, unless the cutlass be better.

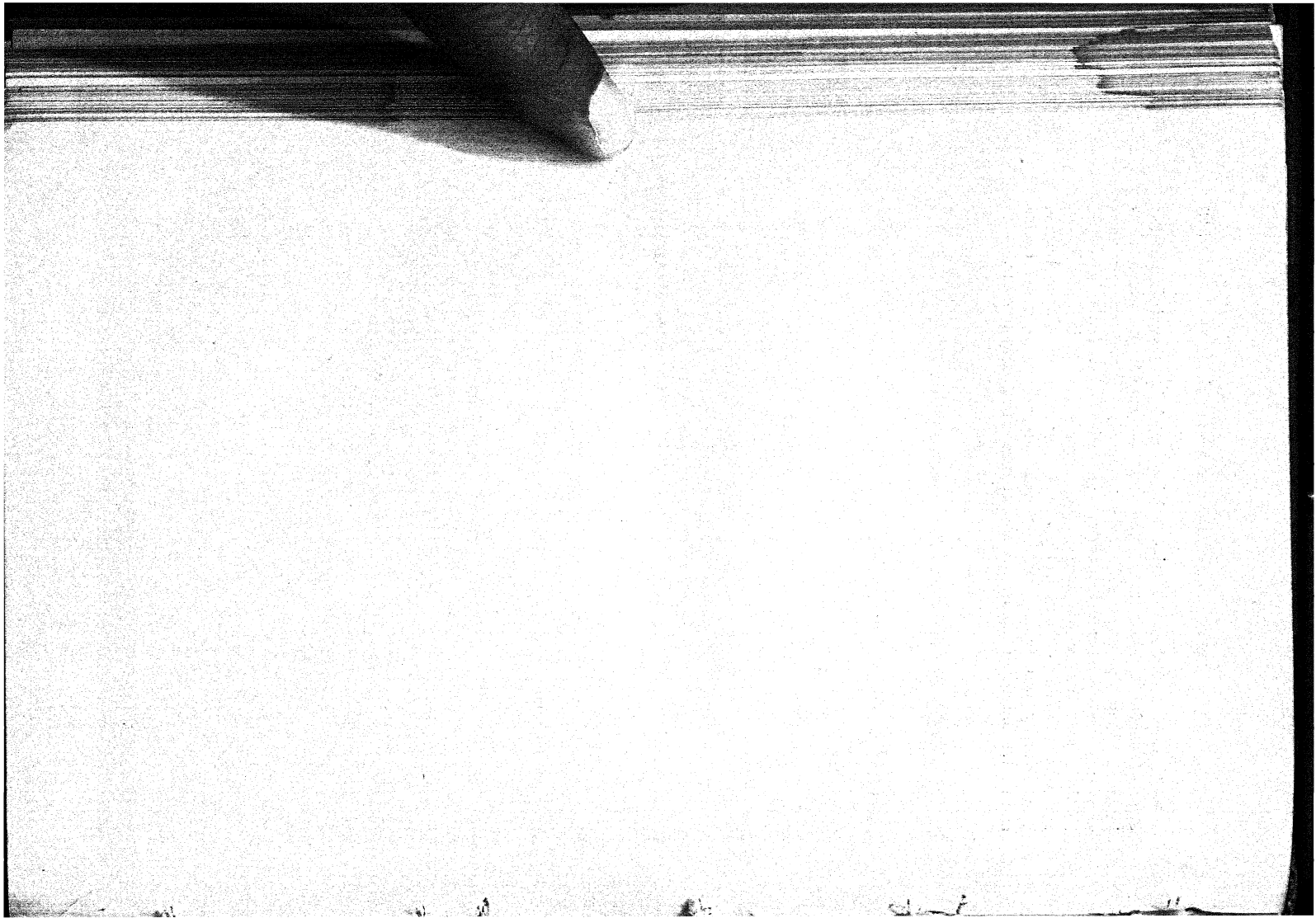
(*e*). Each soldier should have a pair of waterproof saddle-bags to be attached to the saddle by dees on either side. If the rifle-bucket is adopted then only one saddle-bag can be used.

(*f*) Each soldier should have in place of the Regulation great coat, waterproof cape with hood, the cape to be sufficiently long to fall below the knee when the man is mounted.

The above remarks have been made solely with an eye to efficiency on active service. In peace time, as regards dress and equipment, some concessions must be made to appearance.

In equipping a corps of mounted infantry so as to enable it to dispense with transport for a short time there are certain provisions that have to be made for the corps, as a whole, as well as for individuals. Each man can carry his rations (tinned beef, biscuit, preserved vegetables, tea, sugar, &c.), some grain for his horse, a change of kit, spare shoes and nails, stable gear, mess tin and extra ammunition. But the carriage of the following things must also be provided for, *viz.*, cooking-pots, the men's daily ration of rum (this in cases of urgency must be dispensed with), hospital and veterinary medicines and farriers' tools. For these spare led horses specially equipped are requisite. They can be led by the hospital subordinates, farriers and company cooks, as every officer has a second charger that can be ridden by his groom, and carry grain, stable gear and clothing for both chargers, and any other requisites. All the above articles must be so carefully packed and adjusted that the horses can move at a gallop without disarranging the loads.

It is very advisable that the saddlery used by mounted infantry should be specially made to fit the class of animal on which it is intended that the corps should be mounted. When one or more regular corps of mounted infantry are raised in India this will be done as a matter of course. As regards the fitting of saddlery exceptional difficulties have had to be encountered in Upper Burma. The difficulty was to get saddlery small enough for ponies of twelve and twelve and-a-half hands. A similar case is not likely to recur,



SELF-AID ON THE BATTLE FIELD.

A Lecture delivered by Dr. ZIEMSSEN, Staff Surgeon of the German Landwehr.

Translated by Sergeant J. J. Königs, B. U. L., Librarian, Quarter-Master-General's Department, I. B.

GENTLEMEN,—Your ever active committee gave you at our last meeting a lecture in regard to the weapons which are most effective in disabling soldiers in the field in the quickest possible manner, and I have to-day been asked to place before you a few facts to demonstrate how the effects of those weapons upon a wounded soldier can be most readily counteracted so as to enable him to again take the field in the shortest space of time.

I am sorry to say that your weapons have the advantage over our profession so far as rapidity and accuracy are concerned. With your weapons it takes you about one second to kill or disable a man at a distance of 500 metres (or 546·8 yards) ; on the other hand it takes us on an average 500 seconds, or about 10 minutes, to adjust the necessary bandages alone, and after the bandage is put on, it takes months, and often years, to patch the man up, even if it is possible to do so. In this matter I may compare a surgeon to a watchmaker : one blow destroys his mechanical work of art, but only with great labour and continued attention is he able to repair it.

But to give you any idea of the many intricacies of our profession I would be compelled to describe many details of some difficult operations, which, though perhaps interesting, would, I am afraid, give many of you nightmare ! But as such an idea is entirely contrary to my tinention I will simply mention here that the same principle which has asserted itself in our public organisation has affected the war surgery in a like manner—I mean the conservative principle.

How much our profession has succeeded in ameliorating suffering, and improved in surgical operations, may be seen by the fact that many of the wounded, who in the last campaign, for instance, had the misfortune to get either one or both their ankle bones completely shattered, may to-day be seen parading the streets in so easy and natural a manner that even a doctor would be greatly puzzled to distinguish which foot had been dislocated, so that you can easily perceive how impossible it would be for a non-professional to detect any flaw, so to speak, in their anatomy.

Yes, even dislocation of the neck, which in former times was looked upon as absolutely incurable, although a difficult operation and by no

means devoid of danger, can now be successfully treated by a surgeon. As an instance I would recall to your minds the case of the coachman of the prison van who was conveying the would-be assassin *Nobiling*, who attempted the life of His Majesty the Emperor of Germany in the *Unter den Linden* at Berlin. He ran his van against the parapet of the gate, and broke his neck in the proper acceptance of the term. That coachman was successfully treated and recovered. I can give you another instance—a personal experience of mine. About two years ago I treated an officer who broke his neck at a race meeting at Hanover. That officer now promenades the *Wilhelmstrasse*.

You will readily perceive therefore that our profession can achieve great things, but it must always be remembered that everything depends upon the manner in which each case is handled from the outset. This is especially the case with wounds. The main principle to be observed is that proper measures are taken at the right moment. For an operation to be successful great care must be taken to prevent, as far as possible, any foreign substances making their way to the wound ; such foreign bodies will eventually prove injurious to a great degree, and in many instances render all the efforts of a surgeon futile.

It must, therefore, be perfectly clear that from the very moment the wound is inflicted, and when no doctor or dresser is at hand, the treatment may be said to commence, and, if neglected then, little can be done afterwards. With these preliminary remarks I will proceed with my lecture on *Self-aid on the Battle Field.*

Self-aid (*selbsthülfe*), an expression often carelessly applied, may not perhaps be the most appropriate term to use in connection with the subject ; but I am sure you will excuse my choice of it when I tell you that I cannot find another word which so exactly and briefly expresses my meaning.

You are all doubtless aware, through the medium of political newspapers, that in the course of the last 20 years great changes have taken place in the surgical profession by the introduction of antiseptic treatment.

This treatment plays such a considerable part in the subject before us, and is so great a factor, from the very commencement, in the success of an operation, that I am compelled to enter into a more detailed description of it here than I should otherwise be justified in doing.

On the basis of M. Pasteur's experiments, whose name is doubtless familiar to you in connection with his wonderful success in cases of hydrophobia by inoculation, the English, or more correctly Scotch, surgeon Sir Joseph Lister, late Professor at Glasgow and now at the King's College in London, came to the conclusion that every wound can be cured without fear of fever, if, when inflicted, it is thoroughly cleansed and kept in the same condition during its subsequent treatment, and at the same time protected from initial blood-poisoning by the prevention of any obnoxious germs, which are certain to be afloat in the air, settling on it.

Sir Joseph Lister, however, discovered that, exposure to the air when the atmosphere is absolutely pure, is more beneficial than otherwise in

many cases. This conclusion is established when we bear in mind the many interesting and successful experiments made by Sir Joseph at Glasgow during the year 1868.

When once this thesis was properly established Sir Joseph worked indefatigably to utilise it in practical surgery, and we all know how completely he succeeded.

Later on the same method was greatly improved upon, more especially by the surgeons in Germany. All that remained was to select such chemicals as were most likely to have a favorable effect on wounds in their preliminary stages, and these we found in carbolic acid, salicylic acid, iodine and, by far the most effective, chloride of mercury.

The losses from wound, fever and gangrene during the campaigns of 1864-1866 and 1870-71 attracted the attention of all doctors and more especially the army surgeons, and induced them to make a thorough investigation of the ways and means of applying this method in the simplest and surest manner on the battle field.

After several unsuccessful experiments it was decided that a suitable and convenient bandage, easily accessible to the wounded soldier, would best answer the purpose, and each soldier was therefore provided with a bandage ready to hand and prepared for use, as I shall explain to you immediately.

Every infantry soldier, as you know, carries such a bandage stitched in the left trouser pocket. The Hussars and Uhlans carry theirs in the front skirt of their tunics; in all other branches of the service it is sewn into the pocket at the back of their tunic. This is the bandage*—I have purposely kept it in exactly the same condition, as issued to the men of the army, so that I may be the better able to demonstrate to you how easily it may be used and how ingeniously it has been constructed. You will perceive that the bandage is enclosed in a case of oiled cloth, which is simply held together by four stitches. The oiled cloth, be it observed, prevents the bandage from getting soiled or dirty, and also protects it against the inclemency of the weather, especially when it rains, and the bandage is most likely to get wet. This oiled cloth also protects the bandage after it has been adjusted.

On opening this case you will find a safety pin. This is to secure the bandage when it has been wrapped round the wound. You will thus see that even the smallest detail likely to be of use has been carefully provided for.

Next we find a cambric bandage and several small pieces of the same material, all of which, as well as the bandage, have previously been soaked in sublimate lotion (1: 1,000 strong)—a solution strong enough to kill all floating germs and also prevent all threatened germs of disease from penetrating further into the wound or doing any injury. Therefore once this bandage is applied all fear from this quarter is at once set at rest.

We will suppose for instance that one of you has received a gun-shot wound. The first thing to do is to clean the wound thoroughly; this

* Which was handed round.

can be done by washing it in pure water or some other liquid, such as wine or brandy. Brandy is a very good wash as the water procurable on the battle field is very likely to contain many impurities. So far so good. Now, after dressing the wound, the small pieces of cambric come into requisition. You must lay them upon the opening or, if there be *two* openings, *i.e.*, the side where the bullet entered and the gap made when it left the body, a piece of cambric should be applied to each opening. The next best thing to do is to press the wound slightly so as to cause a better suction and thus prevent hæmorrhage. Over these pieces of cambric the oiled cloth is carefully placed, and in the case of two openings the oiled silk is divided, one piece for each opening, the inner side being placed nearest the wound, the whole being then bandaged and fastened securely by means of the safety pin. Thus, so far as the soldier is concerned, the primary object is gained, *i.e.*, the wound is kept clean until the soldier comes under the treatment of a qualified practitioner.

The doctor who has to attend to the wounded later on must, of course, again clean the wound so as to remove such foreign bodies as may have entered with the bullet. He has then to extract the bullet itself.

There are, of course, cases where the bullet may remain in the body without any very injurious effects, but nevertheless, if it is possible to extract it, this should and will be done ; in this opinion, I may add, Sir Joseph Lister is with me. In cases where it is impossible or extremely dangerous to extract the bullet, it remains in the body, and, as you have doubtless heard before this, it travels all over the system and does little or no injury. This is a point I especially wish to impress upon you because I recollect distinctly how strongly the wounded, in the late campaigns in which our country has been implicated, insisted upon having the extracted bullet placed in their hands so as to relieve their minds of all future danger.

This is a mistake as I have just now endeavoured to explain to you ; on the contrary it is often a great deal more dangerous to incautiously remove the bullet from the body. I can assure you of this as I have often seen the membranes and muscles cut through in the most barbarous manner with dirty fingers (there was no water procurable for washing purposes) in attempts made to remove a bullet from a wound.

This treatment, according to the science of the present times, should be altogether rejected. If the bullet must be removed (as in many cases it must) it should be done by the antiseptic method advocated by Sir Joseph Lister, as it is always better to allow the bullet to remain in the body than to permit injurious germs to enter the wound in vain attempts to extract the bullet by a series of fresh wounds inflicted for the purpose.

Should any of you ever be so unfortunate as to receive a gun-shot wound I beg that you will have the patience and fortitude to allow the bullet to remain where it has been lodged until proper measures can be taken for its removal without fear of injury to yourselves.

With regard to copious hæmorrhages I may tell you that such are not at all frequent. As an instance, although I have been in the fighting

line during many campaigns, I have never come across a single case of great hæmorrhage from a gun-shot wound. This may be explained by the fact that a bullet or a fragment of a shell does not inflict the same sort of wound as a sword would inflict. A gun-shot wound is more or less bruised and jagged and the blood vessels close up almost immediately after the wound has been inflicted, whereas a sword cut or a bayonet thrust, being sharp, hæmorrhages are more frequent because there is nothing to stop the flow of blood.

Of course I don't mean to lay down any hard and fast rule that gun-shot wounds are never accompanied with hæmorrhages, because in some cases this does occur afterwards, but then the wounded soldier is almost always under proper medical treatment.

Should, however, hæmorrhage ever set in on the battle field this simple temporary bandage which you see before you is the best and most suitable to stop it, whether caused by gun-shot or sword wound. In fact this bandage is most efficacious in sword or bayonet wounds unless very severe, because such wounds do not, as a rule, penetrate so far into the body, nor do they force so many foreign substances along with the steel as a bullet under similar circumstances would carry. They are therefore more or less surface wounds, but a bullet may cause an internal wound, thereby making the business a great deal worse.

Where a blood vessel is severed or a bone shattered it stands to reason that the wound is far more complicated.

Should the severed artery be on the surface, so to speak, you will observe that the blood flowing from the opening will be dark and sluggish, and the blood will escape from the outer ends of the opening. Should, however, an internal artery be severed the blood is of a light colour and will jet out in sprays from the centre of the wound.

The treatment in each case is regulated accordingly, but so far as the wounded person himself is concerned the simplest way is to apply a moderate pressure to the wound. This can best be done with the aid of one's fingers; the only disadvantage at which the wounded are placed is that the fingers in all cases become benumbed by continuous pressure. It is not advisable to use too much force on a wound; the slightest pressure will be quite sufficient.

Should the wounded soldier be at a distance from the field hospital the best thing I would advise him to do is to bandage the wound in the following manner:—

The first thing to be done is to bandage the wound with the sublimate cambric as already explained; then the nearest round hard substance within reach, such as a stone or a handkerchief knotted, &c., should be immediately applied to the wound over the bandage. This will act as a pressure; and when this pressure has the desired effect (*i.e.*, stops hæmorrhage) a strap or brace or any other bandage should be tied round the whole so as to give even pressure all over the affected part.

I have here with me a tourniquet to simplify the process to you, but a strap of any kind will answer quite as well.

But I do not purpose to enter into any detailed description in regard to the severance of blood vessels, because such a subject can have very little

interest for a non-professional. Were I to do so by to-morrow morning you, who are now listening to my address, would most likely have forgotten all the nice theories which I would try to expound to you. It would be the same with me were you to give me an exhaustive account of the details of your repeating rifles such as were given at the last lecture.

But to resume: the next thing to think of in cases of bone fracture after the wound has been dressed as above described; whether it be an arm, a leg or foot which is injured, the limb must be given a certain amount of rigidity, and this can only be accomplished by means of splints, that is, the wounded soldier takes any kind of a support most handy, such as a bayonet, sword, drumstick, or rifle or any other stiff and resisting implement which will answer the purpose, and places it against the injured part as an improvised splint, and secures it in its position by the aid of a handkerchief, bandage or strap of any kind which the soldier may be most easily able to possess himself of. It is understood that the soldier may not be able to apply a professional ligature because the necessary material is wanting, but the chief utility of such a bandage consists in the fact that the wounded can then be conveyed more easily with less pain and irritation to the tissues, from the battle field to the hospital.

This is almost all that the wounded can do for themselves on the battle field and before medical aid can be summoned.

The treatment consists chiefly in the application of the antiseptic bandage, with which every soldier in the German army is provided, and I would earnestly beg of you, should the necessity ever arise, to use it, as I have endeavoured to explain to you, as quickly as possible.

Before closing my lecture I wish to make a few observations in connection with field hospitals in case of war. Very few of you are aware from personal experience of the great misery suffered by the wounded, but you have doubtless read the history of the Napoleonic wars, the War of Independence, the Crimean war, the Italian campaigns, and are to some extent aware of the numbers of good soldiers who died of their wounds after being admitted to the field hospital.

Thanks to the indefatigable exertions of the Medical Department of the War Office, which has everything to the smallest detail already arranged during peace, and thanks also to the progress made during late years in the medical profession, especially in the antiseptic method of treatment, and further to the many pain-killing properties which have been discovered in chloroform, morphia, cocain, &c, I am thoroughly convinced that every wounded soldier who is once fortunate enough to reach a German field hospital will be saved for his fatherland.

OCCASIONAL PAPERS.

THE following extracts are reprinted from "A Sketch of War as it will be," by Colonel Sir Lumley Graham, Bart., published in Vol. XXXI, No. 138 of the "Journal of the Royal United Service Institution" :—

"A SKETCH OF WAR AS IT WILL BE.

IT would be difficult to find a subject of deeper interest to the readers of this Journal than that which has been chosen for this article. At the present season, when each succeeding day brings with it a fresh crop of war rumours from all parts of Europe; when all the great military Powers, which have for many years vied with one another in perfecting the organization, equipment, and training of their Armies, seem to be putting the finishing touch to their preparations; when many think that the outbreak of another great European conflict is imminent, and but few believe in the possibility of its being postponed for any length of time: at such a season as this, it is but natural that we should take a mental survey of the situation, and endeavour to form an opinion as to the probable chances of the coming struggle. We know not yet how the different nations will be arrayed, but we cannot fail to observe that, during the last few years of peace, progress in military efficiency having been universal throughout the European continent, the same general system of organization being, moreover, now common to all, and the disposable forces of each nation not being widely different in point of numbers, it is very difficult to assign to any one Power the superiority over any probable opponent. Nor is this the object of the present article, which only pretends to present to the reader a slight picture of the manner in which war will be waged between civilized nations the next time it occurs. In order to do this I have translated some portions of Parts IV and VII of Baron v. d. Goltz's great work "*Das Volk in Waffen*" (the Nation in Arms), which enable us to realize to ourselves the enormous proportions of modern warfare, and the great difficulties caused thereby to those in command, whilst suggesting to us means for overcoming those difficulties. Unless we, too, become a *nation in arms*, which will, I hope, never be necessary, it is highly improbable that any British Commander will ever be called upon to conduct war on the huge scale represented by Colonel v. d. Goltz; but it is all the same desirable that the British military student should form his idea of war from a life-size representation rather than from those in miniature, to which he is accustomed, and in which alone he is likely to be engaged, therefore I hope that the following pages will be useful. (L. G.)

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IMPORTANCE OF DISCIPLINE ON THE MARCH AND IN ACTION.

When we realise the size of armies, we may well ask ourselves how it is at all possible to direct such large bodies of men. The answer to this question is that discipline alone makes it possible to move and guide them. There is no better solution of the problem. But the word "discipline" means so many things, that what it comprises does not seem sufficiently well-defined,

and the subject requires further explanation. Discipline is generally understood to mean good order and good conduct, upheld by steady maintenance of strict regulations. But with reference to this, we must observe that a severe code of military law is by no means necessarily accompanied by regularity and good conduct. There never was an army better disciplined than that of Germany during the last war, yet there never was a large army which took the field under such a mild code, which was moreover administered in the most humane manner. On the other hand, the history of former as well as of more recent times furnishes many examples of the coexistence of Draconic severity and of misconduct, without any diminution of either.

The French Republic of September 4th, 1870, kept a bullet in store for every disobedient soldier, and instances of military executions were by no means uncommon in its armies. Yet discipline was and continued to be loose. The actual fundamental relations between the two things was natural enough. All laws spring first of all from the surrounding circumstances and only react upon them later on. We must not, however, imagine that discipline comes naturally in a well-regulated society, and that it is only the consequence of social morality. Not so; the trials to which the soldier is exposed are too severe for this to be the case. It follows as a matter of course that crime is less frequent in the army of a cultivated nation than in those of coarser races, but discipline requires more than merely negative services. It demands of the soldier that he should make nothing of venturing his life in order to overcome the enemy. It demands of him extraordinary efforts, and leads him to look on the extraordinary as something quite commonplace and habitual. The best explanation of discipline is found in a saying of Darwin's, to be found in his "Descent of Man": "The superiority which disciplined soldiers have over undisciplined hordes is principally a consequence of the confidence which each man places in in his comrade." This unqualified confidence is doubtless the best agent by which discipline works, and it enables us to form a just appreciation of the peculiarity of what we understand by this much-used expression. There is, however, doubtless an absolute necessity for a code of law sufficiently strict to cause obedience to a superior to seem imperative. "The force of the passions cannot be restrained without the help of law" is a saying of Scharnhorst. Insubordination must, whenever it shows itself, be at once checked promptly and with sufficient vigour.

It would be a fatal error to imagine that a strict administration of the law can be dispensed with, as this constitutes the framework upon which discipline is constructed. The impression thereof is all the deeper in that the necessity for obedience extends alike to high and low throughout the army. Example has a far greater effect than precept, whether given in writing or by word of mouth. When the soldier sees those above him obey, he takes the lesson to heart. It is not, however, enough to obey the superior who is at the moment giving orders; it is to duty above all that obedience must be paid. Nothing should appear to the soldier more holy than the requirements of his calling. The common, every-day duties are more intelligible than the higher duties to the private soldier. Hence comes the value of the regulation in our army that the Officer should begin by performing all the duties of the private. He must first learn to obey, so that he may be able to command; that is to say, in the right manner and in a way intelligible to the plain sense of the common soldier. Further, this is his only chance of becoming thoroughly acquainted with the performance of the lowest class of duties according to his knowledge of which the men will after all really judge him. The zeal with which the, so-called, *minor* duties have been for so long a time

carried out in the German Army is by no means merely the result of routine or of unproductive pedantry, but is rather due to the moral aim of creating in the soldier's imagination a representation of duty in a manner adapted to his intellectual powers. The conscientiousness in small things should certainly not be confined to the mere technical details of military life; on the contrary, the many things which do not appear on the surface and which are required to make a man of the soldier deserve special consideration. A disposition to cleanliness, love of order, punctuality, carefulness, faithfulness, and decision, will best contribute to the establishment of good discipline. The custom has hitherto prevailed of leaving certain minor details of administration, such, for instance, as concern the clothing and subsistence of the men, in the hands of company Officers. This is not done with a view to economy, but in order to strengthen the influence of the Officer over those under him by means of the intimate intercourse thus produced. An Officer's work in the stores and in the barrack-room, in visiting cook-houses and other offices, makes of the company commander the guardian and main prop of discipline, the father of his men, and the expression of the soldier's artless feeling is full of significance when he jokingly calls his Captain, as he is wont to do, the "old un," although he sees older Officers giving the law to him.

This peculiarity in German army life, in combination with the belief in the necessity of a strict performance of duty, has created a feeling of most complete unity in the ranks. Therein consists our strength. The most complete interdependence between Officers and men has arisen from the zealous performance of duties common to both. Every man in the ranks knows by experience that his Officer will in no case desert the unit to which he belongs, that the same unit is like a family, with the same interests in common, and that it will always hold together in need and peril. Hence springs that confidence of which Darwin speaks, and by which that great judge of human nature explains the superiority of a disciplined force. The soldier meets the enemy's bullets with composure, because he is convinced that his comrades have the same feeling, and because he cannot think of leaving them in the lurch. The moral force derived from the feeling of interdependence remains firm when the excitement and confusion of battle render control impossible, and regularity, which is the offspring of law, has ceased to exist. The sentiments of duty and honour rouse at such moments in the heart of each soldier the firm resolve not to be behind his neighbour. During the last wars every single body of troops being thus inspired was ready to attack a superior force of the enemy whenever it appeared expedient to do so for the general good, or whenever a favourable opportunity presented itself.

Every General who ventured to take this serious responsibility did so in the assurance that every corps within reach would hurry to the scene of action as soon as it heard the thunder of the guns, and that the work so successfully commenced by himself would be completed by his comrades if his own strength proved insufficient for the purpose. Every leader was justified in thus thinking and in thus acting, down to the youngest subaltern at the head of a section of skirmishers. It is evident how great an augmentation of power thus accrued to the German army, and we can also well imagine how the Commander-in-Chief, notwithstanding his limited influence over the course of combats and battles, could yet prosecute these decisive operations with full confidence, knowing as he did that, though their procedure might vary, the different fractions of his army when put in motion would all aim at the same end, namely, to get at the enemy. No Officer in command who could possibly reach the scene of conflict would keep away

from it. The "discipline" of the German army was a sure guarantee of this.

Such is the way to render troops really mobile. The more numerous they are, the better must be the discipline, and we require it now more than ever, but it must be rightly understood if we wish its power to be displayed; it must be identified with the complete agreement of all members of our hosts in the object of their desires, in the faithful performance of duty, and in devotion to the service of king and country. Although the principal source of discipline in an army is to be sought in moral influence, still in order to maintain it we must also look to purely material elements. We need hardly say that if troops are exposed in warfare to insupportable hardship, to fatigue surpassing what human strength can endure, to demoralizing influences in battle, to want and distress, the best discipline will in the long run suffer, and above all that unnecessary hardship and loss have a loosening effect. A great deal depends upon organization. It is of primary importance that the formations to which troops have been accustomed in peace should be preserved in war, for their disruption will always have a prejudicial effect on discipline, and the mischief thereby caused almost always outweighs the advantages which may be derived from breaking up tactical units so as to increase their number.*

It is well known, for instance, how much the discipline of the Danish army was affected in 1864, in consequence of the order issued by the Minister of War that all battalions should be subdivided, so as to form a double number of war battalions. However, it is impossible to break up the family feeling in our army. It is a part of the inner constitution of our military system that every Commanding Officer has more confidence in, and exerts more influence over, his own regiment, battalion, or company than he would in the case of a body of troops placed for the first time under his command at the outbreak of a war. Again, the soldier always obeys Officers known to him more readily than strangers. The maintenance of units as originally constituted is of such paramount importance that secondary considerations of convenience on the line of march and in battle must not be allowed to weigh against it *

It may generally be accepted as a fact that a complete regiment of three battalions will be able to render much more service in war than three battalions taken from different regiments, and shuffled up together under one leader for the special occasion. Were we to mingle in an arbitrary manner together detachments from different Army Corps, the question of provincial peculiarities would then come to the fore. Some races in the German Empire require severe treatment, whilst others do better under a lenient rule; some should be humoured, others guided with a tight hand. A well-timed reproof will be most effective with the one, generous praise with the others. There is a considerable difference between the characteristics of a Brandenburger and of a Westphalian, between those of a Rhinelander and of an East Prussian. The Officers who lead the men in war should have been previously acquainted with them in peace-time. It is of great importance to discipline that men who have returned to civil life after doing their time with the colours should, if recalled to the ranks on mobilization, rejoin

* These sound principles have, I think, never been completely recognized in the British Army, for the system of grouping together detachments for some special service has always been far too prevalent. Never, however, was this vicious system carried to such an extravagant pitch as in the last campaign on the Nile, and as fortunately no positive disaster resulted therefrom, we may, I fear, expect a repetition of the same error in our next war. If so, I hope that we shall only have savages to deal with.

the same units in which they received their military education. They will thus be brought into association with old acquaintances, both as comrades and superiors, with whom they will easily get on good terms again; in fact they return to a position with which they are familiar, and in which they soon feel themselves quite at home. They have once more to have a share in the fortunes and in the reputation of the very corps to which they were before so proud to belong. The feeling of *esprit de corps* comes into play, a feeling which creates a noble emulation between bodies of men. The various considerations which must be duly attended to at the time of mobilization will, it is true, not always admit of a reserve man joining his own former corps, but this should be the rule whenever possible. The spirit of tradition and *esprit de corps* can only be well developed if Officers are retained in the same units with as little shifting about as possible. This particularly applies to the case of commanders of companies, squadrons, and batteries, in whose hands is the instruction of the men. Again, the peace strength of units should not be too much reduced, otherwise they can hardly hope to keep up their traditions, besides which a considerable numerical strength is required for certain branches of instruction. Companies and battalions with too low a peace establishment lose the power of acting as independent units, for they cannot represent properly at field exercise the action of companies and battalions on a war-footing, in consequence of which you are driven to the objectionable practice of mixing up several of these units and placing them under command of one of their Officers. This is what happens in France. If practised with us it would break through the fundamental principles of all our military education, of all order and discipline, which consists in the personal responsibility of every Officer for the efficiency of the body of men under his immediate command. His personal interest in the men, his personal influence upon them, would be diminished, and sooner or later discipline would suffer. We may mention another kind of discipline as necessary, and we may call it the intellectual as distinguished form moral discipline. If men's minds are not under control it becomes all the more difficult to manage them.

This is often experienced unpleasantly in an improvised army. When bodies of militia or of volunteers are assembled in an emergency there is, as a rule, no want of very capable and educated men amongst the Officers, as the pick of those who have not as yet adopted the career of arms must under such circumstances take the field. Many members of the highest aristocracy in France joined the armies of the Republic in 1870, occupying the lowest grades. There was thus plenty of intelligence in the ranks, but only of an undisciplined kind, with a great want of uniformity as to instruction, which led to a want of unity in action. We do not by this intend to imply that the leader should be bound to act according to a prescribed system. Not so; for cut and dried forms do not suit war. Still, there should be a certain mutual agreement as to the mode of working out military problems, and this will be the case if you succeed by means of instruction and practice in implanting general principles in the minds of your Officers. Those principles should be inculcated by the instructor as leading guides to action, just as general directions (*directiven*) are issued by the General when providing for some particular operation.

The art of handling troops should be taught according to a regularly recognized system. Only thus can we arrive at obtaining any similarity of procedure on the part of Officers in the execution of any definite operation; not that we expect or wish them to work exactly in the same manner, but only to be guided by the same principles. The solution of theoretical problems set as exercises to different Officers in peace-time presents plenty

of variety, being intended to test the intelligence, and therefore leaving plenty of room for difference of opinion. In war everything is much more simple. When, for instance, the German armies were assembled on the Rhine in 1870, you could hardly have found a General amongst them who did not at once make up his mind to an advance into France, for we all felt anxious to take advantage of the superiority of our Army both in respect of numbers and of efficiency by at once assuming the offensive in a vigorous manner, for we had all, as it were, inhaled this principle with the air of our military school. When this discipline of the intellect exists a Commander-in Chief may with confidence allow much independence of action to his subordinates, as he may be certain that wherever he cannot intervene in person affairs will be carried on, if not exactly as he would have wished, at all events with the same practical result. Uniformity of intellectual culture is only possible when all Officers occupy the same social position, and it must necessarily be absent in armies whose corps of Officers is partly recruited from the ranks, partly from military schools and academies. For such armies complete unity of action can never be assured.

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Marches, Expeditions, and Quarters.

Slowness and weariness characterize the movements of large bodies of troops. You realize this fact when, after the band has ceased playing, you get a near view of the individuals composing the mass instead of that distant glimpse which Clausewitz supposes.* Here one poor fellow limps along with heavy knapsack on back and rifle on shoulder, struggling to keep up, and you can hardly help fancying that you yourself feel the pains which an ill-fitting boot inflicts upon his poor galled feet. Another struggles on with forehead bathed in sweat, and with pinched features, which clearly show exhaustion. Here and there a man completely worn out and near his end is led aside and breaks down entirely. From hour to hour the train of men, horses, and carriages creeps on with greater slowness. Everything is wrapped in dust, so choking that eyes and lips can hardly be opened. The sun has no mercy, shooting its burning rays without pity against the mountain side along which the road winds, and thus generating insufferable heat. The head of the column alone can move with some rapidity, the further back you go the greater the apparent fatigue; here no songs are heard. The longer the column, the more encumbered with guns and wagons, the greater its unwieldiness, the more frequent the stoppages and involuntary halts. The smaller the body of troops, the more easily and comfortably it moves, and therefore the more rapid its progress. The imagination of the aspirant to command, who is learning war from books, requires correction in nothing more than with regard to the speed with which large masses can progress. Giving the rein to his fancy, he directs his columns on the map, after rapidly forming his plan, first to one place, then to another, making them reach points of importance very quickly, so as to occupy these posts before the enemy can arrive, after which come deployment and attack, the steps following one upon another without interruption. But should this ideal future be converted into matter of fact, you will then see how far actuality lags behind intention.

The columns advance at a pace the slowness of which is very trying to the patience, and the fear that the enemy will be the first to reach our objective grows stronger every minute, for imagination lends wings to the foe, whose movements we cannot follow so closely as those of our own people,

* The author here refers to a picturesque passage which he quotes from Clausewitz, and which I have omitted.—L. G.

and in our fancy we see him striding on at a great rate. It often happens too that orders to march have been delayed too long, and that the time required for the movement has been underrated, but the inexperienced leader has no power of imparting to the masses the fire which burns in his own breast. The heavily-laden foot soldier looks with much indifference at the Officer who harangues him from the saddle; the most he does is to step out a little while the chief is close at hand, soon, however, resuming his former rate of marching, for he knows by experience that if he always answered to such appeals with extraordinary exertions he would soon come to the end of his strength. It is terribly difficult to rouse up the whole column out of its snail's crawl; nothing will do so but the thunder of the guns, which is sure to quicken the steps of the brave. The wonderful difference between the marching performances of troops on different occasions is very remarkable, and not always to be explained by differences of nationality and of quality. A march of two or three miles, hardly noticeable on the map, at one time almost uses up a body of men who on another occasion accomplish a march of double the distance without apparent distress. Wind, weather, state of the roads, condition of the men, after-effects of a previous state of things,* habit which affects this branch of military work more than any other, lastly, the personal influence of the Officer who is demanding those exertions of the men, are all factors in this case. Assuming three miles (13½ English miles) to be a day's work which the soldier will perform under ordinary circumstances in six hours, although under difficult conditions he may take eight or even ten hours to accomplish it, the whole day being thus taken up, we yet find Buonaparte doing this distance with his army for seven consecutive days, in the high mountains too, when crossing the St. Bernard. On good ground, five, six, or seven miles (22½, 27, 31½ English miles) were not considered by him excessive distances for whole Army Corps to get over in a day. Murat's cavalry did more than four miles (18 English miles) daily for weeks together when following up the Prussians in 1806.† In later campaigns we find performances equal to and even greater than those frequently recorded on certain days. On the afternoon of the 16th December, 1870, the 9th German Army Corps stood at "La Chapelle Vendômoise," between Blois and Vendôme, in readiness to move. When it became known that the German position on the Loire was threatened, Prince Frederick Charles put this corps in motion towards dusk on Orleans, nine miles (40½ English miles) distant, although it had before reaching "La Chapelle" already marched two miles (9 English miles), and had afterwards spent some hours on fields soaked with rain.

The roads leading to Orleans were bad, having been newly metalled; moreover, wagon trains which were following the IInd Army met them and delayed them in their progress. Yet the Army Corps reached Orleans next day at noon without any loss worth mention, 10, 10½, 11 miles (45, 47¼ 49½ English miles) in from 33 to 36 hours, including a halt at night as well

* Such conditions, for instance, as made themselves felt in the march of the IInd German Army from Metz to the Loire. Although the daily marches were not at first long, although the weather was pleasant and the roads good, a considerable number of men became non-effective, for the whole army had passed through a very severe and trying time, suffering hardships of all kinds just before the capitulation. Although later on, "the marches became much more severe they did not produce the same bad effects, because the men gradually recovered their tone and the habit of marching."

† Murat marched, in the first instance, in pursuit of Hohenlohe from the field of Jena to Prenzlau, then in pursuit of Blücher to Zirbeck, thence through Posen to Warsaw, which he reached on November 28, after marching altogether 188 German miles (846 English miles) in six weeks (about 20 English miles a day).

as the time spent at "La Chapelle." One battalion in this column could boast that it had not left one man behind. Only 13 horses out of 4,000 broke down. This feat compares favourably with the best performance of any period * Suwarrow marched from the neighbourhood of Alessandria to the Tidone in June, 1799, a distance of 11 miles (49½ English miles) in 36 hours. In November, 1807, when Junot made his dash on Lisbon, he marched the 35 German miles (148 English miles) between Salamanca and Ciudad Rodrigo through Alcantara in only five days over an inhospitable country and amidst heavy snowstorms, continuing his advance on Lisbon in the same manner, but his army in so doing suffered such loss as to be almost entirely dissolved. We might cite examples from ancient history, but these are always somewhat doubtful, not having been exposed to the rigorous criticisms of modern historians. The instances quoted are, however, numerous enough to prove that one would be liable to great mishaps if one were only to reckon upon average rates of marching, for there is a wide margin for error.

One consideration alone is sufficient to account for the great superiority which the better marching army of the two has over that opposed to it, namely, that the commander of the former is always able to concentrate his forces more quickly than his adversary and to attack him with superior numbers. Hence arose the well-known saying that you can vanquish your enemy with your boots. During a combat a momentary impulse may work wonders, but it would have no effect during a long and severe march. It is very difficult to urge on a body of men who are beginning to get tired, even if vigorous measures be adopted, for as soon as you find some hundreds of men lying in the ditches, severity becomes impossible, and those who don't choose to go any further may throw themselves down and fall out with impunity. You may form a good estimate of the quality of the troops from the number of stragglers during a hard march. The influence of discipline shows itself clearly on such occasions. How much each individual may contribute to the general result is shown by the many examples of armies which, although inefficient in other respects, have after defeat shown an astonishing amount of solidity and marching power. Fear of the pursuing foe and the instinct of self-preservation urge on at such times each individual, and thus increase the endurance of the whole mass. It is very desirable to keep the men in good marching condition in peace-time. Where military training is actively carried on in an army, the constant exercise obtained at field manœuvres, also in moving to and from the drill ground and the ranges, will keep men up to the mark; still it will also be advisable to make special marches to long distances solely for practice in walking.

Owing to the organization of the national armies of the present day, they are to a large extent composed in war-time of men who have not been in the ranks during the period of peace immediately preceding the mobilization. Still the oft-repeated assertion that on that account it is not worth while to knock troops about in peace-time is erroneous, for although men

* The 14th Infantry Regiment made a remarkable march between the 4th and 16th November, 1870, from the neighbourhood of Metz to Paris. It was escorting trains, ammunition columns, and artillery of the 11th Army Corps, the greater part of which was despatched by rail, and it got over 42 miles (178 English miles) in thirteen days. 136 men became non-effective from all causes during the whole period out of a total strength of 2,547 men. It should be noticed also that the regiment had lain before Metz since 18th August, and therefore had all that time no regular practice in marching. The 10th Army Corps marched to the battle-field of Vionville on 16th August, five miles (22 English miles) and the 11th Army Corps to that of Gravelotte, from five to six miles (22½ to 27 English miles).

do lose the mechanical habit of marching when they leave the colours and return to civil life, the traditions of remarkable feats once performed still remain alive in their minds. Exertions which previous experience has taught them to be nothing out of the common way are more easily borne than those of which we have no previous knowledge. If we were to give up the habit of practising offensive movements and long marches in peace-time, the Army would lose the means of judging how much the human frame inspired by good will is capable of enduring without serious injury, and in consequence the demands upon the men's powers would be reduced from year to year, soldiers and Officers accustoming themselves by degrees to look upon what is really only a moderate performance as something remarkable, and such it would become in fact, but only in the minds of the performers. If a misfortune happens once in a way during the summer heats when a hard bit of field exercise is being performed and a man, young and vigorous, falls a victim to sunstroke or to over-exertion, many a voice is at once raised to advocate, on account of what has happened, the abolition of field exercises, without reflecting upon the necessity of giving every soldier the experience which enables him afterwards to undergo the hardships inseparable from campaigning in a far better spirit than if he were a mere novice, and thus to bear them more cheerfully. If you omit every exercise in peace-time which might possibly cause a mishap to some individual you would be treating soldiers very unfairly, for you would be rendering them helpless and weak in war, thus doubling their losses. The period of long marches of concentration, which in former days afforded the best opportunity for regaining the habit of marching, has passed away. In these days troops march straight away from the railway station to the enemy. There is no opportunity for getting the men into condition before the commencement of active operations. Therefore the exertions at first required of them should be moderate. If the 9th Army Corps had attempted at the beginning of the war in the Palatinate the great march which it afterwards made and which we have already alluded to, it would probably have lost a third of its numbers. It is only after war has been going on some time, after liberal field rations and exercise have strengthened the muscles, and after the weaklings have been used up, that extraordinary efforts can with safety be demanded. Much of course depends upon suitable arrangements being made as to the march. It would take up too much space to go into details about them. * * *

A soldier when on the line of march is less affected by the actual distance he has to travel than by the length of time he is kept under arms and with his pack on. Three, four, five, and even six miles (13½, 18, 22½, 27 English miles) are no extraordinary day's work for a good walker. Only think of the holiday trips which one has made in one's youth to the mountain top. It does not require a professional pedestrian, an Albanian, or a Spaniard to demonstrate that even ten German miles (45 English miles) may be walked in a day, for plenty of German artizans and soldiers on furlough have done as much in their anxiety to get home. But it is quite a different thing to roam about in light clothing without constraint and at your ease from marching in the ranks buttoned up in uniform and in complete marching order. The time which the soldier spends thus accoutred should be limited to that which is absolutely necessary for doing the distance. All useless standing about and waiting should be avoided, to ensure which the arrangements should be varied so as to suit the different circumstances. The head of a column marching away from a large encampment must move off hours before the tail, and it would be a great mistake to make the whole force get under arms at the same time. If the troops have been cantoned on

the previous night in a number of different villages, and it is wished, as used formerly to be the case, to rendezvous before marching off at some one spot, the battalions destined to bring up the rear of an Army Corps would have to remain five or six hours at the place of assembly. It is therefore better to collect them into small bodies according to the situation of their night quarters, and to make these groups defile by the bye-lanes into the high roads, and unite just as tributary streams join one another and by degrees form a large river. Careful forethought in making dispositions for the march have great importance on account of their effect on the *morale* of the troops. Every hardship which appears useless in the common-sense view of the soldier annoys him, but he will cheerfully bear even greater hardships when he can understand the necessity thereof. His feeling in this respect is generally founded upon reason, and is not a mere question of routine. Blucher's well-known saying, "Night marches are more to be dreaded than the enemy," is as little worthy of general acceptation as any saying of the kind, for with bright moonlight one can march on good roads without any difficulty almost as fast as by day, and even under unfavorable conditions good troops have in all ages made night marches without damage to themselves. The campaigns of Frederick and Napoleon furnish many examples of this. The German Army Corps, too, in 1870 marched on the 16th December well into the night so as to do some four or five extra miles (18 or 22½ English miles). The example of Werder's army has already been adduced, and how much a comparatively small force can accomplish by a night march was shown by Commandant Bernard when he pushed with his Chasseurs les Vosges from Lamarche to Fontenoy near Toul to blow up the railway bridge. His little party of 1,100 men had to make use of bad roads, often, indeed, going across country, through woods and over hills in deep snow on the night of the 18th—19th January, 1871, doing altogether 40 kilometres (25 English miles). He stood fast during the next night, being meantime disturbed by an alarm, marching on during the night of 20th—21st with 300 men a distance of 35 kilometres (22 English miles), and again 60 kilometres (37½ English miles) further on the night of the 21st—22nd, besides driving off the small German guard on the last night and blowing up the bridge. In addition to this, he and his party had to cross the half frozen Moselle river under difficult circumstances. What is really "worse than an enemy" in a night march is the disturbance of the night's rest, combined at times with long distances and bad food, as was the case in 1806 during Blucher's march. During the same campaign L'Estocq's corps made many night marches, and this in winter, without damage to its efficiency.* Between the afternoon of the 2nd February and the night of the 7th, L'Estocq did over 20 German miles (90 English miles), chiefly along bye-roads covered with snow, and mostly at night. This does not include marches into cantonment and to the places of assembly. Notwithstanding all this exertion the little corps was able to make on the 8th February its famous march to the battle-field of Pr. Eylau, where it decided the fate of the day. The conventional dread of night marches, which cause them now to be looked upon as a sort of mortal sin in a military sense, requires to be eradicated. In future wars when great masses have to be moved in a small space, several Army Corps being obliged to follow one road, we shall not be able to dispense with night marches. When they are made, care must be taken that the soldier gets his full allowance of sleep, for he cannot dispense

* No troops have probably had so much practice in night marching as the British in India, and some notable examples of both night and day marches might be cited from the history of the Mutiny.—L. G.

with it whilst undergoing the great physical exertion of field service. There is one thing worse than an occasional night march, and this is the custom of issuing orders too late, owing to which the men are as a rule kept awake late into the night. The same holds good of getting under way too early in the morning. The so-called soldier's rule* that it is better to march out of night into day than out of day into night is a mistake. If you do the former thing it means that no one has had his night's rest, whilst if you do the latter it signifies only that you get to your night's quarters rather tired. Meckel gives the right rule when he says that in the case of large bodies of troops they should never, if it can be avoided, commence their march before 6 A.M. in summer, and 8 A.M. in winter. Even then, each company, squadron, and battery will have to get under arms at a very early hour. Good order on the line of march makes things easy, and you should insist upon good order being kept from the very beginning, and not wait till disorder has commenced. But good order should be maintained simply for the purpose of lightening the soldier's labours; all annoying martinetism should be avoided. Extraordinary indulgences, such as carrying the men's packs for them, and such like, are justified by extraordinary circumstances. If such alleviations connot, however, be allowed, once and for all, it is better not to spoil the men by giving them advantages which they will afterwards miss terribly if deprived of them. Military manuals lay great stress on the service of security when on the march, but too much is made of this, for troops when on the march are quite ready to go into action. What we really require on such occasions is reconnaissance. We are looking for the enemy and we require information about him. We know that the cavalry divisions which precede us are doing their best to obtain it. It is customary, too, for a separate advance guard of all three arms to precede the column, thus freeing it from apprehension of surprise. If shots are heard in front, if the column comes to a halt, if it is reported that the enemy is near at hand, uneasiness and disquietude will otherwise spread through the whole force. Both Officers and soldiers are affected and the movement is disturbed. If on the contrary an advance guard is half an hour's march in advance, it will take upon itself the consequences of all that may occur on the march, and thus the main body enjoys a happy feeling of security, for it feels that an obstacle must present itself which the advance guard cannot deal with before the rest of the force is called upon to act.

But the advance guard need not be strong. Formerly it was considered correct to employ a third or a fourth of the whole force on this duty. The propriety of this rule appears very doubtful, for by adhering to it the General loses all control over a considerable portion of his force, as he creates a command independent of his own.

The greater part of the cavalry is always attached to the advance guard, even when cavalry divisions have been sent on in front; for none but horsemen can keep up a proper communication with the latter and transmit intelligence swiftly from them to the rear. This rule, however, does not hold good on impassable wooded mountains, or even in particularly intricate and roadless countries, mountainous and otherwise, or in passing through long and difficult defiles, in passes, or on causeways where it is difficult for

* I think that the "soldier's rule" is the right one, and that "it is desirable to get over a march as early as possible, to give time for camping, cooking dinners, and long rest." (See a paper on "Marches," by the late Sir G. P. Colley, when a Major and Professor at the Staff College.) To march out of night into day is disagreeable no doubt, but, I think, less harassing to troops than marching out of day into night.—L. G.

a horse to move, and where considerable bodies of cavalry could not possibly operate. In such situations infantry must form the head of the advance guard. Some artillery will always be of use, for this arm will be the first to detect whether any obstacle thrown in our way by the enemy is in earnest or not. Even dismounted troopers pushing on, carbines in hand, may easily be stopped by a handful of determined men posted behind a barricade or on the outskirts of a village or wood, whereas gunners will lay the ghost with a couple of well-aimed shell or shrapnel.

Moreover, an advancing enemy will be more easily stopped and forced to show his strength by unlimbering a battery than by any other means. An advance guard only requires a small force of infantry. As before said, it must be strong enough to give the main body which is following in its footsteps time to form line of battle. The experience of the last wars has, however, taught us that the main body as a rule did not form up because, owing to the pressing necessity which existed for supporting the advance guard when already seriously engaged with a superior enemy, the troops had to be brought into action little by little and higgledy-piggledy. This went on as a matter of course. It is difficult to make out at first whether the opposition which an advance guard is going to encounter will be strong or weak.

A commander of an advance guard who halts as soon as the event appears to him doubtful will delay the advance, and must expect to meet with severe censure if after all the enemy proves not to be in force. Every good soldier prefers being blamed for excessive daring rather than for too much caution. Should the affair turn out badly in consequence of the former line of conduct he may still console himself by saying with Francis I of France, "Tout est perdu fors l'honneur;" but in the other event he has no consolation, and in an army with an inclination for active enterprise no Officer will be placed on the shelf at the end of a war because he has once shown want of proper caution if he has on the whole gained a character for daring and enterprise. This is much more likely to be the fate of one who, though admitted to be well instructed and thoughtful, is considered somewhat too cautious.

Therefore we may be all the more certain that every courageous advance guard commander will in doubtful cases resolve to attack. If then he has besides cavalry and artillery a whole regiment, or even a brigade of infantry at his disposal, he has at once a strong inducement to try the fate of battle. What commander at the head of such a force would allow it to be said that he permitted the enemy to deceive and to stop him by a bit of bounce, or that he let a favorable opportunity escape of giving that enemy a serious blow? Better far to dare!

A combat can easily be stopped as long as only your cavalry and artillery are engaged. The latter are a longish way from the enemy, and the former can use the speed of their horses to get away if advisable; but it is more difficult to break off the action if infantry is once engaged, for it is not possible to recall at once all the scattered parties. If you succeed in stopping the fire in one place it breaks out in another.

Bugle calls can seldom be used on account of the misunderstanding which may arise amongst neighbouring bodies of troops. Then if you succeed at length in getting your own skirmishers to keep quiet, the enemy, who is in consequence no longer held in check, makes use of the opportunity to press forward, thus forcing you to resume hostilities in self-defence. And so it comes that after a good many alternatives the commanders see that things must be left to settle themselves. The stronger the force of infantry engaged the greater the impossibility of breaking off an action. For instance, if the commander of an advance guard has only a single battalion

to dispose of he will be more easily induced to come to a halt on meeting with resistance, with a view to giving the Divisional or Army Corps Commander the power of deciding upon the line of action. No one can expect him to attack in earnest with such a small force of infantry, while at the same time this force is sufficient to overcome an opposition only intended to deceive. When the reconnoitring cavalry division of an advancing force with the addition of one or two battalions and some infantry from the advance guard is not enough to force a passage, a really serious combat generally becomes necessary to overcome resistance, and the General had better leave this to be decided by the whole of his forces. We thus come to the conclusion that even in the case of a Division or of an Army Corps a single battalion will be enough to follow the mass of reconnoitring cavalry, affording, as it will, sufficient protection to the artillery of the advance guard unless this only consists of horse batteries which accompany the cavalry. If it is evident beforehand that the advance guard will have a special mission, such as that of quickly securing some position, it will naturally be strengthened, and its composition will be adapted to the purpose of carrying on a serious engagement.

* * * * * * *

The best way of gaining time for the deployment of your main body is to push your cavalry well forward, so as to gain early notice of the enemy's approach, and to be able to determine in good time when and where it is best to form the line of battle. If it be necessary to gain time, it will be better to do so by bringing some batteries into action, thus forcing the enemy to deploy, than by engaging a large body of infantry. The former course commits you to nothing, while the latter course will quickly bring on a general action. The case is different when you are in retreat and wish to avoid fighting. Rear guards must be stronger, so as to be able, when favourably situated, to punish the enemy if he presses on too much, whilst the main body continues its retreat without interruption, but even in the case of rear guards an obstinate battle is a mistake, because the difficulty of continuing the retreat is thereby increased, and the consequent losses become more serious; or else the main body is obliged to countermarch in order to disengage the rear guard, thus defeating its own object. It is only towards dusk, as a general rule, that a rear guard may engage in a serious combat without danger, because the enemy has not then time to make use of his superiority. It is, however, well to bear in mind that in our latitudes darkness does not come on all at once, and that an active enemy may do a good deal as long as there is light enough to aim. Artillery will therefore play an important, in fact the principal part, with rear guards as well as with advance guards. Its far-ranging and powerful fire is best suited to keep the enemy at a distance, which is the task of all rear guards, and the longer the guns remain in action the better they perform this duty. The risk thus incurred of losing some of them should not be regarded, and should never be considered a reason for limbering up prematurely. It will be wise to attach some batteries from the main body temporarily to the rear guard. The same considerations which regulate the relative position of troops of the different arms in advance and rear guards extend to the actual column of route. In rear of the cavalry comes a part of the artillery, that is to say, of the arm specially required to open an action, but the risk which may arise from the defeat of the cavalry and from the consequent penetration of the pursuing enemy into the column, to batteries, helpless as these would be in the line of march, has led to the custom of placing at least some infantry in advance of the guns. Of course all the artillery is not quite so far to the front, for in that case the

infantry which is behind it would arrive too late upon the battle-field. The corps artillery of one Army Corps which occupies above 7 kilometres (4⅓ English miles) of the column must not be wedged into an infantry division, because the infantry in rear of the guns would not reach the scene of action for 1½ hours after that in front of them, and the Divisional Commander would have to do without half his force all this time. It is customary, therefore, to place the corps artillery between the two Divisions of the whole Army Corps in using one road.

Hitherto we have only had in view marches leading directly on the enemy, but we must now say something of those which pass across the front of his position or of his columns, such as are called flank marches. These have the credit of being dangerous and difficult enterprises. Military experience, however, teaches us that one may venture more in the way of flank marches than theory admits. Frederick the Great made a flank march at Prague round the right wing of the Austrians, and at Kolin all along their front. In those days it was difficult to move an army which had once taken up its fighting position, for it was not allowable to disturb the order of battle. There was, therefore, no great risk of counter-attacks on the part of the enemy, and the King, indeed, never had any dread of them. All is now changed. The separate portions of every army are now able to act independently, and can undertake with greater facility a counter-attack against any of the enemy's columns which may march across their front; but still even now, when a large body of troops has deployed, it is a matter of time to put it in movement in a direction not before contemplated. Before this can be done the right moment for action has very often passed by, or else the commander is at least doubtful whether it will not pass away before he can act, and therefore gives up the attempt. If the enemy does not undertake the flank march with his entire force, but leaves a part of it in position, we must take care lest, when making a counter-attack, we find ourselves between the two bodies, that on the march and that halted, thus getting into difficulties; and so we see flank marches in sight of the enemy succeed even at peace manœuvres.

The risk is greater if the enemy is already in movement while you are making the flank march, in which case it will be prudent to keep at a greater distance from the heads of his columns, or to occupy his attention by bringing into action simultaneously troops distinct from those making the flank march. When moving straight to the front it is, as a rule, of no consequence whether you encounter the enemy and have to form up a quarter of a mile (over an English mile) nearer or further off. When making a flank march, on the contrary, you always have a distinct end in view, which you would rather gain without any fighting or delay. Thus all interference on the part of the enemy is inconvenient. You watch him with a certain degree of anxiety, and you thus become impressed with the idea that you are attempting a difficult enterprise. Besides which it is only natural that we should think more of a danger which threatens flank and rear than of one towards which we are advancing. The soldier when on the line of march assumes that his leader knows the enemy to be directly in front of him. If, however, that enemy appears suddenly on a flank, then men in general are apt to become impressed with the notion that they are surprised, an idea which shakes their confidence. Flank marches which even the private soldier can see to be intended as such are made with ease. This is proved to be the case by the numerous marches for purposes of concentration made within the lines of investment round Metz and Paris in 1870-71. Those were really all flank marches made in presence of the enemy occupying the ground in rear of

and between the forts. But the situation was clear to all, and everyone knew that during the march attack was only to be feared from the side on which the fortress stood ; hence the feeling of being in an extraordinary situation was dispelled, and the troops marched without apprehension along or close behind the line of investment towards the threatened point, the whole proceeding appearing to them quite natural, and no special precaution being ever taken on these occasions. Yet, to take an instance, at the time of the battle of Noisseville (September 1, 1870), the field works along the Prussian line were in many parts still very slight, and the position was in greater part only held by outposts, so that as large a force as possible might be available for field operations. An Army Corps on the march, if suddenly attacked in flank and obliged to show front to that flank, forms a fighting line three miles in length (13½ English miles), in which are various gaps more or less large, but you will hardly allow yourself to be so completely surprised as to be compelled to form to a flank on the actual road which you are following. There will always be time enough to gain a position on one side of the marching column, and in such a position you can form up more quickly than to the front, because the distances to be traversed are shorter. The tail of the column is, as we know, 24 kilometres (15 English miles) from the head, and the rearmost troops will only have 11 kilometres (7¾ English miles) to march to a flank position about 3 kilometres (2 English miles) from the line of route, on the assumption that the extent of the position taken up is 4 kilometres (2½ English miles), that the troops marching at the tail of the column will only have to gain the nearest flank of the position, and that the latter is neither near the head nor tail of the column, either of which cases will be of rare occurrence. The situation will be less favorable when, owing to the nature of the ground, it is impossible for troops to form up to a flank from column of route, for instance, in a narrow mountain pass, but the very nature of the ground in such a case will generally protect the marching column from interruption, for the enemy will find no roads by which to move to the attack. According to the rules of art, troops when making a flank march should be covered by a corps specially detached for the purpose, behind which the movement will be made, but the very presence of such a corps will very often draw the enemy's attention at once to the operation. The said corps, moreover, can only be one of small strength, and it will thus invite attack from the very enemy whom you wish to keep at a distance. Whenever, therefore, the distance or the nature of the country are of themselves sufficient to give some security against attack, it will be better to dispense with the covering corps, and to content ourselves with keeping the enemy under careful observation by means of our cavalry. When a detachment is sent out as above supposed, it is often difficult to draw it in again safely, and the whole operation is therefore delayed. When, in 1866, Benedek made "his well-conceived" flank march from Moravia to the Upper Elbe, he placed the IInd Army Corps, which happened to be in advance, and the 2nd Cavalry Division in position fronting towards the country of Glatz, a measure which served to delay the whole operation. During the Napoleonic period it was held that a position taken up for battle should always be of great depth, which will seldom be the case if we have to repel an attack made on us whilst making a flank march, and are consequently forced to form up towards the flank, but in the present day we may dispense with depth of formation, as modern firearms give great power of resistance even to a thin line. The prejudice against flank marches should, then, be treated in the same way as that against night marches, that is to say, it should be overcome. When on

some future occasion two armies form up opposite to one another on the frontier and in close proximity, the possibility of a first success will depend on rapid concentration on one point, which can only be accomplished by means of bold and rapid flank marches. This will be specially the case when we find ourselves in front of a chain of barrier forts, between which the enemy has taken up his position. Of course some caution is necessary in making a flank march. It will be advisable to shorten the column of route by diminishing the intervals between the different units, and by marching on as large a front as possible. Naturally, too, baggage and trains should not follow in rear of the troops when crossing an enemy's front, but take parallel roads near the column on the side furthest from danger. One may often take advantage of night for flank marches which would otherwise have to be made in view of the enemy. If a whole army is engaged in the operation, attention must be paid to the possibility of deploying in some strength to a flank at need. This would be a case in which one would be evidently justified in making two Army Corps follow one another at as close intervals as possible on the road nearest to the enemy. Further formations seem unnecessary. When the IInd Prussian Army advanced into Bohemia at the end of June, 1866, the VIth Army Corps followed the Vth on the exposed left wing, which to a certain extent was making a flank march across the head of the enemy's columns then coming up, the two corps being, as is well known, temporarily united under the command of General v. Steinmetz.

Clausewitz says that the wearing effects of marching are so great that next to battle it is the operation the most productive of loss. This is doubtless accurate. Thousands of men will always be used up on the line of march even if every care be taken. Nepoleon lost, when advancing into Russia in 1812, during the fifty-two days which it took him to do only 70 miles (315 English miles), nearly 100,000 men by sickness and straggling. Bad discipline had in great measure to account for this probably, but in any case his losses on this march would have been extraordinary. Even if the men who fall out do not die, they are at all events lost for the term of the campaign, filling up hospitals and etappe stations on the line of communication, and causing serious embarrassment.

Prince Frederick Charles ordered all his stragglers to be formed into companies, and to be used as garrison troops in rear of the army in 1870, which turned out to be a very judicious measure, as it enabled him to keep units in the front which he would otherwise have been forced to leave behind, and moreover the hard guard duty made those left behind anxious to rejoin their corps. Although an Army Corps may in special cases far exceed the ordinary distance of a day's march, namely, the length of its own column of route, a General should always carefully consider whether the gain arising from such an effort is sufficient to counterbalance the probable loss occasioned by it. A forced march must, from its material effects, be considered equal to a defeat if the enemy after all eludes you, as will happen, for instance, on eastern theatres* of war, and its after-effect morally is likely to be unsatisfactory, for you will have the consciousness of having made a great expenditure all for nothing.

The journeys of troops play their part now, as well as marches. In the olden times one only heard of sea transport for troops. Napoleon, however, to whom nothing was impossible, forwarded his Guards in 1805 and 1806, and the troops brought up from Spain in 1814, to the scene of operations in carriages. They thus got over on an average ten miles (45 English miles)

* By *eastern* the author means *Russian*.—L. G.

daily. Now-a-days, as we have seen, millions of men journey to the frontier by rail when the armies are being concentrated. After war has actually commenced, transport of troops by rail on a large scale meets with serious difficulties, the lines being taken up with goods of all kinds, and the railway staff being reduced by mobilization. Moreover, a certain amount of lassitude creeps in after the extraordinary exertions made during the period of concentration. The rolling stock is dispersed. The approach of the enemy causes disquiet, and results are not unlikely to fall short of expectation. It is easier to bring up reinforcements from provinces which are not exposed to attack than to transport troops immediately in rear of or along the front line. As, however, considering the speed of railway transport, roundabout roads will not be of much service for concentration, we must be prepared for the sudden and direct transfer of large masses from one point to another on the line. The army on the defensive, being at home, has a great advantage in this respect. During the campaign on the Loire in 1870, 28.000 infantry of the French 15th Army Corps were conveyed from Salvois in the Sologne by Vierzon and Tours to Mer, near Blois, and to Vendôme, being thus transferred from the left to the right bank of the Loire, between 7 A.M. October 27th and 9-20 P.M. October 28th, without its being noticed by the Germans. 16 batteries, 2 regiments of cavalry, ammunition columns, &c., followed the infantry during the latter night up to 8 A.M. on the 29th. In November of the same year, 40,000 men of the three arms, under General Crouzat, travelled in eighty-eight trains from Besancon on the Doubs, to Gien on the Loire, in three days, this latter movement only becoming known to the Germans after its completion. From time to time during the campaign on the Loire, French military trains travelled at only ten minutes' interval. On the other hand, the attempt to transfer Bourbaki's Army with extraordinary rapidity from the Upper Loire into the valley of the Doubs, at the end of December, 1870, failed, owing to defective preparations and to want of unity in command. Two Army Corps and the general reserve, consisting of one Division, took three days to unload, and altogether ten days to complete their journey, which it was hoped to accomplish in half the time. An Army Corps, which followed the army later on, took from the 4th to the 16th January to get from Nevers to the Upper Doubs, near Belfort, because it found the line blocked by the unusual accumulation of trains conveying troops, material, and supplies.

It would have been better to have moved part of the army by road than to depend entirely upon rail transport, particularly in the case of the single line on the Upper Doubs, the smallness of the stations on which made detraining a long business, and the expeditious establishment of a second line of rails and of sidings was impossible owing to the small amount of space between the river and the hill-side. The invader will find it even more difficult during operations in the enemy's country to shift large bodies of troops from point to point along his front, although he will naturally deem it advisable to repair the lines occupied by him, and to make use of them. We may mention, by the way, as examples of the use of railways in an enemy's country, the following occasions in 1870-71, when the Germans took advantage of the French lines. The 14th Infantry Division, whilst besieging the fortresses on the northern frontier, was conveyed, between the 7th and 14th January, 1871, from thence by rail to Chatillon-sur-Seine, the combatant portion being assembled at that place on the last-named day. Trains and columns followed. After the fall of Strasbourg, the Landwehr of the Guard Division was transported to Paris, beginning its entrainment on 7th October, and arriving by instalments at Nanteuil between the 10th and 19th. It was obliged to use the main line by Frouard, which was already in great request. In the same way, the 11th

Army Corps was forwarded from Metz to Paris. The 3rd Infantry Division, consisting of 10 battalions, 1 squadron, 4 batteries, 1 pioneer company, 2 hospital detachments, 1 field oven column, 1 field hospital, 1 supply column, altogether 120 wagons, did the journey in twenty-four trains between the 3rd and 8th November. The 4th Infantry Division had already commenced its entrainment at Pont-a-Mousson on the 26th October at midday, the whole of its combatants, together with field hospital and the necessary columns, being assembled at Longjumeau by the 6th November. A part of the corps marched by road to Paris. As a general rule, the railways will do little for an invader but bring up from the rear necessary supplies, ammunition, and drafts of men. The advantage to be gained by using the rail instead of marching is evident from the fact that while we reckon the ordinary rate of marching at three miles (13½ English miles) in the twenty-four hours, we may count upon doing 90 miles (405 English miles) in the same time at a moderate speed. The trial to the troops will, however, be somewhat greater owing to the loss of their night's rest. At the same time we must remember that troops are able to make a moderate march at the end of their journey, and will indeed generally be very glad to do so after sitting still for so long. The difficulty of transporting large bodies of troops by rail consists more in entrainment and detrainment than in the actual conveyance from place to place. When there is only a single line of rails blocks must frequently occur, so that in such cases you must reckon upon less work being done, and upon a greater degree of uncertainty in traffic than when there is a double line. The greatest number of trains to be counted upon daily on a single line is generally found to be twelve, whereas the number may be put at eighteen on a double line. Colonel Blume, however, after the experience of the war of 1870-71, considers it advisable to reduce the estimate to eight and twelve respectively.

This is certainly well within the mark, for it only equals what the French accomplished in 1870—71 on the occasions which gave rise to so much complaint as to slowness of movement. Whenever circumstances render it in any way practicable, transport by rail should be preferred to the route march, for casualties inseparable from the latter are inevitable, but a careful calculation should always be made as to which mode of transport is the quicker. You require on an average eleven days to despatch an Army Corps complete on a railroad with one line, and seven days to do the same on a double line. The same corps can march 30 miles (135 English miles) in eleven days, 20 miles (90 English miles) in seven days.

It is only when the railroad extends to a greater distance that there is any saving of time in using it for a whole Army Corps, but it is very often only of consequence to convey part of the force expeditiously to a certain point, so you send that by rail, and the remainder of it follows on foot. It is often a good plan to combine the two modes of transport, conveying the infantry by rail, and sending cavalry, artillery, trains and columns, by road, making longer marches than usual. Some guns and cavalry may be sent with the infantry, with a view to immediate employment on arriving at the end of the journey; in the same way, a small force of infantry may be despatched with the troops which march by road. The extraordinary services which railways render in provisioning and supplying an army, as well as for transporting the combatants, will always render it advisable for an invader to get the full use of them as soon as possible, therefore he will carry on the repair of railways which have been destroyed as his army advances. The construction of provisional supplementary lines, like that made in 1870 from Rémilly to Pont-à-Mousson so as to turn Metz, will in future be undertaken on a larger scale than heretofore. Railways are now-a-days indispensable for siege operations, as a modern siege train can

hardly be transported to any distance by road. Not to mention the weight of the guns, the mass of material required is so great that 20,000 horses, and as many men, would be required to convey a siege train without interruption to a distance of 20 miles (90 English miles). From 350 to 400 tons of ammunition are now fired away daily before a large fortress. The use of railways is therefore now a *sine qua non*, for by no other means could such weights be transported to such a distance daily for any length of time.

The following figures give some useful hints as to the employment of railways in war. A train may convey one battalion, or something over one squadron (so that one may reckon three trains to a cavalry regiment of four squadrons), or one battery, or one supply column, &c. An Army Corps with its belongings requires 90 trains. An infantry division without baggage requires 20 trains. A cavalry division also without baggage requires the same number. From these data it is easy to calculate how many days any particular body of troops will require for despatch. An Army Corps will need, as already shown, 11 or $7\frac{1}{2}$ days, according to whether there be one or two lines of rail. Under similar conditions a cavalry or infantry Division will require $2\frac{1}{2}$ or $1\frac{2}{3}$ days. Now as a troop train does, as a general rule, at the outside four miles (17 English miles) in an hour, the length of time required to convey the various units to a distance of 100 miles (450 English miles) will be as follows :—

An Army Corps on one line of rail.....	12 days.
„ „ on a double line.....	$8\frac{1}{2}$ „
The advance guard of an Army Corps...	$2\frac{1}{2}$ or 2 days.
An infantry or cavalry division.....	$3\frac{1}{2}$ or $2\frac{2}{3}$ „

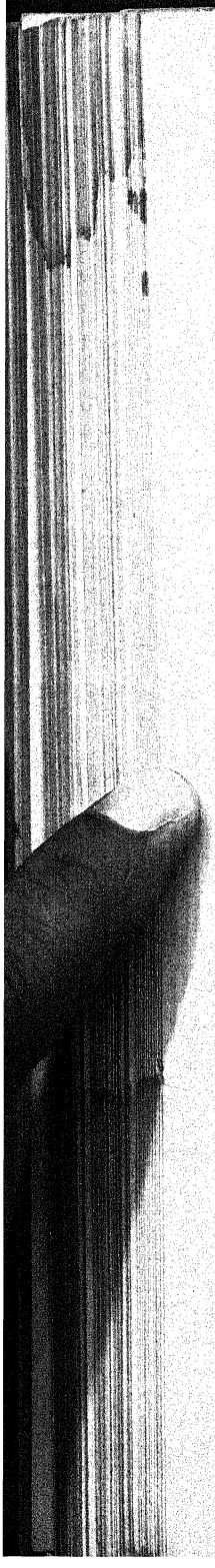
As, however, the examples already cited from the Franco-German War show, the rate of travelling may at times be greatly increased.



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MEDALS AND HONORARY DISTINCTIONS GRANTED UNDER THE ORDERS OF THE GOVERNMENT OF INDIA.

By BRIGADIER-GENERAL SIR F. B. NORMAN, K.C.B.

WAR WITH MYSORE, 1780-1784.

Continued from page 171, *No.* 60, *Vol. XIII.*

ON the 18th March, 1778, war was declared in London against France. The Secret Committee of the Court of Directors immediately despatched news of the same to the Governor-General *viâ* Cairo, and desired that prompt measures might be taken for the capture of the French settlements in India. This despatch reached Calcutta on the 7th July, and on the same day Warren Hastings wrote to the Governor of Fort St. George directing him to arrange for the siege of Pondicherry, and set an example by taking possession of Chandernagore on the 10th. He also empowered the Governor of Fort St. George to enter into a treaty of friendship with Hyder Ali, who, it was said, had made overtures with that object, the Governor-General considering that such a treaty would at all events divert him from making engagements with the French. He ordered the army in Bengal to be augmented by four battalions of native artillery men and nine battalions of native infantry, and volunteers were obtained from the European regiment for two companies of artillery. The Calcutta militia was embodied to the number of one thousand men. The defences of the river were put into an efficient condition, and three months supplies stored in Fort William. The squadron under command of Commodore Sir Edward Vernon being very weak, one of the company's ships and another, which had been purchased for this purpose, were equipped and manned as ships of war, and sailed within the month to join the Commodore.

Intelligence that war between Great Britain and France was imminent had reached Madras in June, and on the 29th of that month orders were issued for assembling a force at Conjeeveram. Immediately after receiving the Governor-General's instructions the Government of Madras directed Major-General Sir Hector Munro to assume command of this force, and active arrangements for prosecuting the siege of Pondicherry were commenced. On the 8th August Munro encamped within four miles of Pondicherry,* and the next day summoned the place to surrender. The summons was treated with scorn. The following day, the 10th, a hotly-contested action was fought in the roads between the British and French squadrons, which ended by the French returning to Pondicherry. On the 20th the French fleet was again seen standing out of port. Sir Edward Vernon advanced to meet it, but the French commander, taking advantage of night, avoided an engagement and sailed away, leaving Pondicherry to its fate. Munro now prosecuted the siege with vigour. The garrison under M. de Bellecombe made a gallant and skilful defence, and were greatly aided by the heavy rain, which retarded the operations of the besiegers, so that it was not until the 15th October that a passage across the ditch had been made. Then only did the Governor think of surrendering. Favorable terms were offered, and the garrison became prisoners of war, but the colors of the battalion of India were restored to it by the victors in token of their admiration of the distinguished conduct of that corps. The defence had been stubborn, and the casualties in Munro's army amounted to 906, including 34 officers.†

Karikal had already fallen into the hands of the British, and Mahè was now the only settlement remaining to the French. It was determined to get possession of it also. Hyder Ali remonstrated, declaring he considered the place as his own, and that the French were occupying it under him. His remonstrance was disregarded ; and Colonel Braithwaite, with two battalions of the European regiments, three battalions of native infantry, and two companies of artillery, was ordered to proceed against Mahè. He arrived before that place early in March ; and on the 19th it surrendered. It had been intended that, after the reduction of Mahè, Braithwaite with the greater part of his force should have joined Goddard in Gujarat, but owing to complications with the Nairs this intention had to be abandoned. On the 29th November Mahè was blown up, and the force moved to Tellicherry, which was threatened by the Nairs.

* Pondicherry was founded by Francois Martin in 1674. In 1693 it was taken by the Dutch, but restored in 1697 by the treaty of Ryswick. It was unsuccessfully besieged by Admiral Boscawen in 1748. Besieged and taken by Colonel, afterwards General, Sir Eyres Coote in 1761 and restored by the peace of Paris in 1763. Besieged and captured by Sir Hector Munro in 1778 and restored by the peace of 1783. It was taken by Colonel Braithwaite in 1793 and not restored until 1815.

† In April, 1779, the General Court of Proprietors unanimously passed a vote of thanks to the Secret Committee for the prompt manner in which they had issued orders for operations against the French settlements, and further presented the members of the Committee with eight hundred guineas for the purchase of plate. Thanks were also voted to Sir Hector Munro and Sir Edward Vernon, to each of whom was presented a sword set with diamonds valued at seven hundred and fifty guineas.

Hyder was greatly exasperated at the capture of Mahè, as it was through this settlement that he had been in the habit of getting his recruits and supplies from France. Whilst he was in this state of exasperation he heard that Lieutenant-Colonel Harper had been sent to occupy the Guntur Circar and that he purposed marching thither through Mysore territory. Hyder openly declared that he would not allow the English to occupy Guntur, and directed his officers to oppose Harper's advance. Harper was permitted to continue his march until he had entered a narrow winding defile between two precipitous hills; suddenly he came upon a breastwork lined with troops; large bodies of men were now seen on the hills on either side, and a heavy body of troops was drawn up in rear of the breastwork. Harper at once determined to retrace his steps, which he succeeded in doing without becoming involved in serious hostilities.

It also happened that just at this time an envoy arrived from the court of Poona soliciting him to join the confederacy which had been formed to drive the English out of India. Hyder readily agreed to the proposal, and promised to put forth the whole of his strength for this purpose. In February, 1780, Sir Thomas Rumbold, the Governor of Madras, sent Mr. Gray to Seringapatam to offer an alliance with Mysore. Mr. Gray was treated with indignity and the proffered alliance contemptuously declined. Mr. Gray returned to Madras on the 30th March. On the 6th of the following month Sir Thomas Rumbold sailed for England, having in a Minute, dated the 3rd, recorded that all was tranquil and no immediate interruption to the calm was to be apprehended.

Mr. Whitehill was now Governor of Madras. He, too, saw no cause for alarm. That war was imminent was patent to all except the Governor and the majority of his Council. Muhammad Ali, the Nawab of the Carnatic, in vain informed the Government of Hyder's warlike preparations; his advice and intelligence were alike unheeded. In the middle of June Lieutenant-Colonel Lang, who commanded at Vellore, received certain information that Hyder had marched from his capital. Lang promptly sent this intelligence to Madras; his letter was received on the 19th. It was treated in the lightest manner, and he was informed "that he saw danger at too great a distance." No preparations whatever were made to meet the coming storm save that the detachment, formerly commanded by Harper, but now under Lieutenant-Colonel Baillie, was directed to recross the Kistna. Even on the 17th July, when Hyder was actually advancing to invade the Carnatic, the Commander-in-Chief declared that all apprehension was groundless.

Hyder laughed at the supineness of the English, and in a paper of intelligence from his army, delivered to the Madras Government on the 26th July by Muhammad Ali, he is reported to have said, speaking of the English: "I have tried them already, and I know them well; they have no conduct; and even now, when I have assembled my whole force to enter their country, they have not shown the least glimmering of light." On his part every preparation had been made.

with the greatest care. He moved from his capital in the month of June with an army estimated at close upon 90,000 horse and foot, besides 2,000 rocket men and 5,000 unarmed pioneers. He had a powerful artillery, and a large proportion of his troops had been trained by French officers; he moreover had a body of French troops in his pay. His commissariat was admirably organised by a Brahmin, named Poornea, one of his ministers of finance.

Having completed his arrangements, Hyder ordered prayers to be offered up in all the mosques and the Hindoos to perform their ceremonies for the attainment of success. Moving slowly to the frontier he sent forward emissaries to bring over the officers Muhammad Ali had placed in command of his more advanced posts. But the corps of spies whom he had sent to obtain employment as guides to the English had not yet been taken into pay by them, as no military operations had been determined on; "there was no plan to divulge, no projects to frustrate, no movement to anticipate."

On the 20th July, 1780, Hyder entered the Carnatic through the Chengamah pass, and from thence his progress was marked by the blaze of towns and villages. Round every place he had determined should fall to his arms, he drew a wide circle within which all the towns and villages were doomed to destruction; and he directed the indiscriminate mutilation of all human beings who hesitated to obey the order for instant emigration, accompanied by their flocks and herds. From Chengamah Hyder detached a select corps of 5,000 horse to plunder Porto-Novo, a seaport some fifty miles south of Pondicherry, whilst other troops were sent to carry out the work of desolation before described.

Black clouds of smoke were to be seen in every direction from St. Thomas' Mount, distant only nine miles from Madras, before an order for the movement of a single soldier was given. The corps under Colonel Baillie was ordered to march to Conjeeveram, and Braithwaite, who was at Pondicherry, directed to march with the troops at that place to Madras. Lieutenant-Colonel Cosby was sent from Madras to the eastward to collect all the disposable force south of the Koleroon, with which he was to act on the enemy's communications through the passes.

Owing to dissensions in the Council the presence of the Commander-in-Chief at Madras was necessary to secure a majority for the Governor. It was, therefore, decided that the command of the army in the field should be entrusted to Lord Macleod, who had recently arrived from England in command of the 73rd Highlanders.* Macleod was ordered

* John Lord Macleod, eldest son of George III, Earl of Cromartie, who joined the rising in 1745, after the battle of Falkirk and the retreat of the Highlanders to the north, the Earl, with his son Lord Macleod, was surprised and taken by a party of Lord Sutherland's militia at Dunrobin Castle on the 15th April, 1746. They were sent prisoners to Inverness and from thence to London; the Earl was tried by his peers, found guilty of high treason, and sentenced to death, and his estates and honors forfeited to the Crown. The sentence of death, however, was remitted. Lord Macleod on account of his youth received an unconditional pardon, and shortly after went abroad in quest of military

to assemble the army at Conjeeveram, an open town forty miles in advance of Madras, and the country round it in all directions occupied by the enemy. He protested against this order, urging the vicinity of Madras as the only safe point of assembly until the army should be in sufficient force, by the junction of all its detachments, to meet the enemy in the field. He positively refused to assume the command of the army in its then badly-equipped state, but at the same time offered to march at once at the head of his own regiment. "I," said his lordship, "have been a great many years in the service, and I have always observed that when you despise your enemy he generally gives you a *d*——*d* rap over the knuckles." The Commander-in-Chief refused to alter his plans, and pledged himself to carry out the junction of the detachments as originally proposed. He accordingly assumed command of the army, a majority in Council having been secured by the appointment of an additional member, a measure against which the opposition protested as illegal.

Lieutenant-Colonel Baillie had been ordered to march by a route which would have taken him through a country overrun by Hyder's troops. He, however, took upon himself to move by another route, and on the 24th August arrived within two easy marches of Munro. The strength of Baillie's detachment was 207 Europeans and 2,606 sepoys, with six 6-pounders and four 3-pounders. The main army under Sir Hector Munro consisted of the 73rd Highlanders, one battalion of the Madras European regiment and the Grenadiers of another, five battalions of sepoys, a company of sepoy marksmen and two troops of cavalry, the total strength being 5,209, and it had thirty-four pieces of field artillery, four heavy guns and five mortars. Instead of allowing Baillie to join him Munro directed that he should pursue an independent route of upwards of fifty miles to Conjeeveram, "a measure," says Wilks, "inexplicable by any conjecture excepting that of attempting to justify an erroneous opinion."

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employment. He sojourned for some time at Berlin with Field Marshal Keith, and through his interest obtained a commission in the Swedish army. After serving in this service for twenty-seven years he attained the rank of Lieutenant-General. He returned to England in 1777, and was presented to George III, who received him graciously. At the suggestion of Colonel Duff of Muirtown, who had served in Keith's Highlanders, and encouraged by the reception he had met with in the north, he offered to raise a regiment. The offer was accepted, and so great was the influence of his name that 840 Highlanders were enlisted and marched to Elgin in a very short time. In addition to these 236 Lowlanders were enlisted by Captains the Honorable John Lindsay, David Baird, James Fowlis, and other officers, besides 34 English and Irish who were enlisted at Glasgow, making in all 1,1 0 men. The corps was embodied at Elgin and inspected there by General Skene in 1778. Very shortly after a second battalion of the same strength was raised by Lord Macleod's brother, Lieutenant-Colonel the Honorable George Mackenzie. The first battalion under Lord Macleod embarked for India in January, 1779, and having on the passage reduced some French settlements landed at Madras in January, 178 , mustering nearly one thousand men and clothed in Highland uniform. In 1786 the regiment was numbered the 71st Highlanders; in 1708 the 71st Glasgow Highlanders; in the following year the 71st Glasgow Highland Light Infantry; in 1810 the 71st Highland Light Infantry; and is now known as the 1st Battalion Highland Light Infantry.

In the meanwhile Hyder had advanced to Arcot, which he invested on the 21st August. Munro determined to relieve that place, and accordingly marched from the neighbourhood of Madras on the 26th. Hyder, on hearing of the march of Munro, broke up his camp on the 29th, having previously despatched his son Tippoo with a picked body of 5,000 infantry, 6,000 cavalry, twelve light guns and a large body of irregulars to intercept Baillie. Munro reached the neighbourhood of Conjeeveram on the 29th. He had started with only eight days' provisions, and now found that the four days' supply which remained would be little more than enough for two days after he had been joined by Baillie. The official, who had been sent by Muhammad Ali to accompany the army, when requested by Munro to aid in getting supplies, replied that he had been ordered to attend him, but had no authority to procure either provisions or intelligence. Munro was thus compelled on the fourth day of the campaign to collect such supplies of food as could be found in the large but ruined town of Conjeeveram, and the small supply he was able to collect he deposited in the Hindoo temple, a spacious building capable of being speedily made defensible against a *coup de main*.

On the 25th, Baillie reached the river Kortelar, then nearly dry, but liable to be swollen by the mountain rains. He unfortunately encamped on the northern instead of the southern bank. On the night of the 25th floods of water came down from the hills, and he was prevented crossing until the 4th September. Tippoo was close at hand, but neither on that nor the following day did he do more than harass Baillie's line of march. On the morning of the 6th, however, he prepared to attack Baillie, who took up a position near Perambakum, distant fourteen miles from where Munro was encamped. The action which ensued is described in a note from Baillie to Munro as having lasted from eleven till two, near 100 Europeans and sepoys were killed and wounded by the guns of the enemy, who never came near enough for musketry. The same evening he wrote to Munro, saying that on a review of his troops, after the action, he found that it was not in his power to join the main army, but that he hoped to see the General at Perambakum. It subsequently transpired that Tippoo's troops had suffered much more severely in the cannonade, and he wrote to his father saying that he could make no impression upon Baillie, and asking for reinforcements.

During this day Hyder, who was encamped abont six miles to the west of Munro, made a feint of turning his right in view to covering the operations against Baillie. This led to a change of position on the part of the British army, which now fronted the north on the road by which Baillie was expected. The two armies remained throughout the day drawn up in order of battle at a distance of two miles from one another. At noon heavy firing was heard, which made it evident that Baillie had been attacked and that Hyder had interposed his army between the two British forces. Either, therefore, Baillie's detachment would have to fight its way unaided, first through Tippoo's force and then through the main body under Hyder, or an effort must be made for his relief. Munro, however, did not consider the temple, which now, in

addition to the supplies of the army, contained also the sick, heavy guns, and most of the baggage, sufficiently strong to hold out for even a single day, and therefore decided that he was unable to move from its immediate neighbourhood. He remained quiet in camp on the 6th, 7th and 8th without making an effort to assist Baillie. On the evening of the 8th he received Baillie's note written on the evening of the 6th, still apprehensive that, if he marched to Baillie's aid, Hyder would attack the temple in his absence, and, as the subsistence of the army depended on this magazine, its capture would have completely answered Hyder's purpose, as it would have compelled the army to return to Madras. In this state of doubt Munro assembled a council of war, and it was decided to send a detachment under Lieutenant-Colonel Fletcher to Baillie's assistance. It was composed of the flank companies of the 73rd Highlanders, two companies of Grenadiers of the European regiment, a company of sepoy marksmen and ten companies of sepoy Grenadiers; it numbered all told 1,007 men. Fletcher was directed not to attempt anything against the enemy on the road, and to inform Baillie that, after he had given the troops a few hours rest, he was to move towards Conjeeveram, and that Munro would meet him half way.

The detachment moved out of camp at 9 o'clock that night, a battalion of sepoys having been ordered to keep up a brisk fire in the enemy's outposts to distract their attention, resisting the temptation to attack some parties of the enemy whom he passed whilst they were asleep, and changing his route during the march so as to deceive his guides, who were in Hyder's pay. When day broke Fletcher found himself within two miles of Baillie's camp. To strengthen his position Baillie had cut the bank of a large tank, and had inundated a considerable portion of the country in his rear; wading through this water the detachment reached the camp at 7 o'clock. The arrival of this reinforcement brought the force under Baillie up to 3,720 fighting men.

Hyder was much incensed with his light troops for having permitted Fletcher to pass unobserved. He was, moreover, perplexed as to the object intended by the junction of this detachment with Baillie. Lally and other French officers, who were in his service, were of opinion that it was part of a plan by which Hyder was to be placed between the two forces and attacked on the night of the 9th, and urged him to retire. Hyder, however, decided to maintain his ground, but ordered roads to be prepared so that he might retire to the westward in the event of the conjectures of the French officers being realised. The day of the 9th having passed without Baillie or Munro having moved, and Hyder's spies having told him that the latter was not preparing to move, immediately it was dark he sent off nearly all his infantry and guns in the direction of Baillie, he himself remaining on the ground with all his cavalry and a few light guns, ready alike to retire should his camp be attacked or to harass Munro should he move to Baillie's assistance. At 4 A.M., finding all quiet in Munro's camp, he followed his infantry.

The men of Fletcher's detachment were so much knocked up by their march that it was necessary to give them a longer rest than had been anticipated, and it was 8 o'clock in the evening before Baillie commenced his march for Conjeeveram. His troops were disposed as follows: The regiments which had been engaged on the 6th were in the centre, Fletcher's Europeans were on the flanks, and eight field pieces were distributed along the line; the baggage, followers, and a large supply of cattle for the army was on the left flank guarded by a battalion of sepoys. A battalion of sepoys and two guns formed the rear, and the company of sepoy marksmen the advance guard.

Almost immediately after moving off the advance guard was challenged by the enemy's vedettes; unfortunately no orders had been given not to fire, and the challenge was replied to by a volley. Tippoo's cavalry and rocket men quickly turned out, and the latter, although the flanking parties did their best to keep them at a distance, greatly harassed the line with their rockets. The road, however, being good and the moon bright, the troops marched on at a brisk pace, and after proceeding about six miles entered an avenue of banyan trees on the direct road to Conjeeveram. A large body of horse was now observed approaching from the left rear as if to fall on the baggage. The rear guard was, therefore, halted and prepared to receive the enemy, and the baggage was ordered to the right. This change having been effected the rear guard moved on. In the meanwhile, however, the main body had been advancing, and there was a considerable interval between it and the rear guard. Taking advantage of this the enemy's cavalry threw themselves into the gap. The rear guard again halted, and the officer in command sent to Baillie for aid. At this time the head of the column found itself entangled in Tippoo's camp, and shortly after fire was opened on the centre of the British force from two guns on the left of the avenue. Captain Rumley with five companies of sepoys was sent to seize these guns, but they were found posted behind an embankment with a deep watercourse in its front, and the sepoys retired in some confusion. The British guns now replied to those of the enemy, which they soon silenced, and Baillie, facing the main body about, extricated the rear guard.

Baillie now determined to halt until daybreak; according to Wilks he formed this resolution contrary to the advice of Fletcher, but it is only fair to state the reasons which induced him to halt as given by another writer. John Lindsay* in his narrative says: "Baillie, having found that he had suffered considerably, determined to halt until daybreak for the following reasons: The troops were exceedingly fatigued, his numerous train of baggage and camp followers was in the utmost consternation, and he had a very large supply of provisions for the grand army which he ran the greatest risk of losing, as he was unacquainted with the position of the enemy and likewise with the nature of the ground he was to march over; these

* Lives of the Lindsays, Vol. III, p. 243. Captain the Hon. James Lindsay commanded the Grenadiers of the 73rd Highlanders in this action.

reasons determined him to wait until the day broke, that he might see his enemy and take his steps accordingly.

For the remainder of the night perfect silence reigned on both sides At half past six, on the morning of the 10th, the army resumed its march, and emerging from the avenue entered a large plain. A village was seen distant about three-quarters of a mile to the front, but no enemy was visible. Nearly half the force had entered the plain when, all of a sudden, a heavy fire of grape and round shot was opened upon it. For a short time the column marched on, but the fire of the guns continuing with unslackening severity, and doing great execution, Baillie halted, formed line, and commenced a cannonade. The British guns soon gained the ascendancy, and ten companies of sepoy Grenadiers under Captains Rumley and Gowdie were ordered to take the enemy's guns. The sepoys advanced rapidly, and in much disorder, but before they had got within one hundred yards of the guns they were abandoned. Just at this moment a body of horse, which had charged the head of the column and been repulsed, reformed and made a feint of penetrating between the Grenadiers and the line. A panic seized the sepoys, and in great disorder they strove to gain the line. The cavalry charged in amongst them and cut up the greater number, and shortly after the guns reopened with increased vivacity.

Baillie now posted his troops in a deep watercourse, and having ordered the infantry to lie down commenced a cannonade, which was maintained for an hour, when the enemy quitted their guns. As Tippoo's cavalry was hovering about, Baillie did not deem it prudent to attempt to seize them, and decided to halt where he was until joined by Munro, who was momentarily expected. Suddenly, a report was spread that Munro was at hand, and almost immediately afterwards infantry clad in red and guns drawn by bullocks were seen moving out of the village. To the surprise of all it was noticed that they were preceded by a body of cavalry, which, in a few minutes, covered the plain, and it then became clear that Hyder with his whole army had given Munro the slip. In a brief space of time Baillie's force was surrounded, and Tippoo was again in possession of his guns, which, together with fifty brought by Hyder, opened a furious fire on the British troops. So closely had the enemy surrounded the detachment, and so vast were their numbers, that it is said their guns did as much execution amongst their own troops as they did to Baillie's. The British guns maintained a brisk fire until, two of their tumbrils having been blown up, their ammunition was exhausted. The enemy now drew nearer, and the rear guard being hard pressed, Fletcher ordered the Grenadiers of the 73rd to move to its support. When the Grenadiers rose to obey this order the sepoys, who up to this time had behaved steadily, rose to and moved to the rear. Seeing this the Mysore horse, thinking all opposition at an end, dashed at the centre, but the Europeans who were there rising up presented so steady a front that they stopped short.

Baillie, seeing no hope of relief, and desirous of saving the lives of the brave men who remained, fastened his handkerchief on his sword and demanded quarter.

It was refused. The British troops now prepared to deliver their fire and sell their lives dearly, but the commandant of the enemy's cavalry, advancing from his men, declared that quarter would be given if the troops would lay down their arms. Upon receiving this assurance Baillie ordered his men to ground arms. The Mysore cavalry, as soon as they saw that the order had been complied with, galloped forward, and the European soldiers impelled by rage and despair seized their arms, and poured a volley into the multitude that surrounded them. The horsemen, who, it was said, were drunk with bhung, furious at the slaughter made in their ranks, rushed on, and in a few minutes all in the centre of the detachments were cut to pieces. Hyder, exasperated at having purchased his victory with the loss of more men than he had overcome,* gave orders that no quarter should be given. His followers were only too eager to gratify their cruel passions, and if it had not been for the humane interposition of the French officers, more particularly of Messieurs Lally and Pimorin, not a man would have escaped.† Of eighty-six British officers thirty-six were killed or died of their wounds, thirty-four were wounded‡ and taken prisoners, and the remainder fell into the enemy's hands unhurt. The loss of the European rank and file was in the same proportion, and of the sepoys two thousand are said to have been killed.

To return to Munro. At daylight on the 10th, when he discovered that Hyder had departed, he moved off in the direction of Perambakum. After marching about four miles he halted and fired three signal guns, and seeing the smoke of the action he moved to his left in a direct line towards it. When he had gone a mile and a half he again halted and fired three more guns, but the signal was not replied to. Shortly after a great cloud of smoke, supposed to have been caused by the explosion of the tumbrils, was observed and the sound of firing ceased. "But," observes Wilks, quoting from a *M. S.* journal, "a considerable period intervened between the explosion of the tumbrils and the massacre, and, assuming that the measurements given in the journal were correct, Munro could only have been two miles off at the time of the ultimate disaster." In his official report Munro says that, when the firing ceased, he moved to the right to the Tripassoor road, and shortly after towards

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* It was computed that seven thousand of his troops were slain. See life of Sir Thomas Munro, Vol. 1, p. 25.

† Captain the Hon. John Lindsay, who commanded the Grenadier Company of the Highlanders, was saved by three French Hussars, who kept off the men who were trying to cut him down, although he was badly wounded. They took him to their commander M. Lally, who had his wounds bound up, put him on his elephant, and sent him to the camp, which was ten miles distant. On his arrival one of the Hussars who had saved him gave him some soup and a clean shirt. The next day the French officers told Lindsay that Hyder had ordered them to give up all their prisoners. They expressed great sorrow at this, but declared that Hyder would inflict condign punishment on them if they refused.

‡ Baillie was among the wounded. He was treated with the greatest indignity by Hyder and kept in irons. He died in captivity on the 13th November, 1782, after a long illness, during the whole of which he was not allowed the slightest comfort nor the advice of a physician.

Conjeeveram, in the expectation of joining Baillie, but meeting a wounded sepoy, who told him of the destruction of the force, he considered it necessary for the safety of the army that he should return to Conjeeveram, where he arrived at 6 o'clock. On taking stock of the supplies, which had so long bound him to the spot, he found that there was barely sufficient left for one day's consumption, and that if he remained the army must starve. After throwing his heavy guns into a tank he commenced his march for Chingleput at 3 A.M. the following day. The march was commenced in confusion,* and for the greater part of the way the force was harassed by the enemy's cavalry, and it was not until 9 A.M. on the 12th that the rear guard reached Chingleput. Nearly all the baggage and stores had either been captured or abandoned, and two hundred of the Highlanders had dropped down from the fatigue of a march of thirty miles on a sultry day rendered still more intolerable by the heat and smoke of the villages, to which the enemy had set fire, and through which the army had to pass.

It will be remembered that Lieutenant-Colonel Cosby had been sent from Madras to collect all the disposable force south of the Koleroon. With a few attendants and at considerable risk he reached Tanjore, and from that garrison, from Trichinopoly and the Tinnevelly country he collected two regiments of the Nawab's cavalry, two thousand sepoys and six light guns, and having with great difficulty succeeded in recrossing the rivers Koleroon and Kaveri, which were in flood, he marched to join Munro at Conjeeveram. His orders being discretionary, he attempted to carry the fort of Chittapet by assault, but through the treachery of one of the Nawab's subadars the garrison were on the alert, and he was beaten back with the loss of two European officers killed and a number of sepoys killed and wounded. After a rest of a few hours he marched for Wandiwash, which was held by Lieutenant Flint. Here, on the 10th, heavy firing was heard in the direction of Conjeeveram, forty miles distant. As soon as it was dark Cosby marched to join Munro, and, knowing that his movements were carefully watched, as a blind to the enemy he left his tents standing on the glacis. When within ten miles of Conjeeveram he met a large body of the enemy's cavalry, who were on the look-out for him, and flushed with victory imagined he would fall an easy prey. Just at this moment he learnt from a wounded sepoy, who had escaped the massacre, of the destruction of Baillie's detachment. Concealing this information, he countermarched his column, and giving out that he had received orders to go to Chingleput for supplies marched in that direction, closely followed by the enemy, but so excellent were his dispositions that he reached the ford of the river, about a mile from Chingleput, with but little loss. When he was about three miles from that place he was seen from a look-out which had been established by Munro

* Lord Macleod was not aroused from sleep until two hours after the army had marched off. His baggage together with all his papers fell into the hands of the enemy. Amongst his papers was a plan for the conquest of Mysore. See Life of Sir Thomas Munro, Vol. I, p. 25.

on the top of a high building. At first the detachment was taken for a party of Hyder's regular troops, but ultimately, by means of glasses, it was discovered to be Cosby's detachment. Munro then ordered some troops to cover his crossing the river, but before they arrived the enemy, thinking further efforts useless, had retired.*

Munro, having collected two days' food from the villages in the neighbourhood, and after depositing his sick in the fort of Chingleput, marched for St. Thomas' Mount, which he reached at 2 P.M. on the 14th September, and the following day retired to a more secure position at Marmelony, "thus," says Wilks, "terminating a campaign of twenty-one days. of which, even at this distance of time, every recollection is associated with sorrow."

News of the annihilation of Baillie's detachment reached Calcutta on the 23rd September, 1780, and the Governor-General at once determined that no effort should be spared to re-establish the power of the Company on the coast. At a meeting of the Council held on the 25th he moved that a detachment of European infantry and artillery should at once be sent to Madras, and proposed to Lieutenant-General Sir Eyre Coote† that he should take upon himself the task of retrieving the honor and authority of the British arms. Coote readily accepted the offer, and on the 13th October sailed from Calcutta with three hundred men of the Bengal European regiment, two strong companies of European artillery, six hundred and thirty gun lascars, and between forty and fifty gentlemen volunteers. He, moreover, took with him fifteen lakhs of rupees to be devoted solely to the use of the army. It was further decided to send a force of native infantry by land to Madras, the prejudices of the sepoys rendering it hazardous to send them by sea.‡

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* Lieutenant-Colonel, afterwards Lieutenant-General, Sir Henry Cosby, Kt., landed on the coast of Coromandel shortly after Lally had raised the siege of Madras. He immediately joined the army in the field, and from that time until 1775, when he was sent to England with despatches, he was continually employed on active service. In 1772 he was appointed Brigade-Major to the army, at that period the highest staff situation on the coast. The following year he was made Adjutant-General with the official rank of Lieutenant-Colonel, being the first officer appointed to that office in India. In 1778 he was selected to command the cavalry of the Nawab of the Carnatic, consisting of seven regiments of 550 men each, with 200 light infantry and 40 artillerymen. At the siege of Pondicherry in 1778 Lieutenant-Colonel Cosby, in addition to the command of this force, acted as Adjutant-General, but on the reduction of the place he resigned the latter appointment.

† On news of the death of Sir John Clavering on the 30th August, 1777, reaching England Lieutenant-General Sir Eyre Coote was appointed his successor. He did not, however, reach Calcutta until the 23rd March, 1779. In the interval between the death of Sir John Clavering and the arrival of his successor Colonel Giles Stibbert held the appointment of provincial Commander-in-Chief, and he was again appointed to the same office on the departure of Sir Eyre Coote for Madras.

‡ As observed by Colonel R. S. Wilson in his History of the Madras Army, the native troops of the Bengal army had not always evinced an aversion to go on board ship. In October, 1758, two battalions sailed for the Northern Circars under Colonel Forde, and distinguished themselves at the battle of Condore and assault and capture of Masulipatam. In 1767 three battalions were again sent by sea to the Northern Circars under Lieutenant-Colonel W. Smith. The arrangements for the comfort of the men on the voyage were most defective. Two of the ships on which they were embarked, the

Coote arrived at Madras on the 5th November, bringing with him the orders of the Governor-General for the deposition of the Governor, Mr. Whitehill, who had obstinately refused to obey the instructions he had received to restore the Guntur Circar to the Nizam. Mr. Charles Smith, one of the two members of Council, who had warned the Government of the designs of Hyder, was appointed Governor in his room pending the orders of the Court of Directors. The military outlook was gloomy in the extreme. Arcot had surrendered to Hyder on the 3rd November, and the Mysore troops were engaged in the siege, or investment of five places held by British officers, *viz.*, Chingleput, Wandiwash, Permacoil, Vellore and Amboor. The whole of the country in the neighbourhood of Madras had been devastated, and supplies were hard to be procured. Coote set to work resolutely to re-organise the army. On the 13th of the month the troops were formed into three divisions; the first or right, under Major-General Sir Hector Munro, was composed of the first regiment of Nawab's cavalry, the detachment of the Bengal European regiment, six companies of Grenadiers from the Northern Circars, and two battalions of sepoys. The centre division under the Commander-in-Chief consisted of the 1st Battalion 73rd Highlanders,* the artillery and stores 2nd Battalion Madras European regiment, the 15th, 17th and 21st Battalions of sepoys. The second or left division, under Lieutenant-Colonel Lord Macleod, was formed of the troop of European cavalry, 2nd, 3rd and 4th regiments of the Nawab's cavalry, the Tanjore Grenadiers, and the 16th Battalion of sepoys. The force, which had been collected by Lieutenant-Colonel Cosby with the exception of the Tanjore Grenadiers, remained under his orders as an independent command, and was designated the Trichinopoly detachment. The total strength of the force was 1,403 Europeans, artillery and infantry, 5,000 native infantry and 800 of the Nawab's cavalry, with a train of artillery consisting of four 5½-inch howitzers, two 18-pounders, four 12-pounders and thirty-six 6-pounders.

Before Coote was able to move from Madras Captain Keating, who commanded the fort at Amboor, had been compelled to capitulate owing to want of ammunition. At last, on the 17th January, 1781, Coote, with but scanty supplies for his troops, and almost totally unprovided with carriage, marched from Madras. Chingleput was relieved on the 19th. On the 21st a detachment commanded by Captain Davies carried the fort of Carangooly by storm. On the 23rd Hyder was compelled to decamp

"Northington" with 630 and the "Earl of Elgin" with 500 men on board, put into Vizagapatam, and the sepoys being in great distress, both for water and provisions, and being moreover much overcrowded, refused to proceed further by sea, threatening to run the ships on shore if they were not allowed to land, which they were ultimately permitted to do. When the detachment was recalled to Bengal, a part embarked to return by sea. On this occasion the ship with the Grenadier companies of the 3rd Battalion foundered during the voyage, and all on board perished. This unfortunate occurrence, combined with neglect in making proper arrangements for the men, created a repugnance amongst the Bengal sepoys to embarking on board ship, which took many years and much conciliatory management to overcome. See Williams' Historical Account of the Bengal Infantry, p. 180, and Wilson's History of the Madras Army, Vol. I, p. 290.

* The regiment at this time could not muster more than five hundred men.

from before Wandiwash, which had been most gallantly defended by Lieutenant Flint and Ensign Moore. The British army reached Wandiwash the next day, and the Commander-in-Chief issued an order expressing his sense "of the judgment, bravery and activity of Lieutenant Flint in defending Wandiwash against very powerful attacks." News was here received that Hyder had raised the siege of Vellore, and shortly after that of Permacoil; this latter place had been ably defended by Lieutenant Bishop, who also was highly praised in General Orders.

Coote now heard that a French fleet had appeared off the coast. He at once marched to Pondicherry, and on his arrival found that seven sail of the line and four frigates, under the command of M. d'Orves, had just anchored in the roads, it having been reported that the French inhabitants had been collecting supplies for the troops which they expected the fleet would have brought. Not a moment was lost in disarming the inhabitants, destroying all the boats capable of passing through the surf, and searching for provisions; but much to the disappointment of the army supplies were only found sufficient for one day's consumption. On the 7th February Hyder appeared in sight, marching upon Cuddalore. Coote immediately moved off in the same direction, and reached Cuddalore the next morning, the French fleet being still off Pondicherry. On the 9th he in vain endeavoured to bring Hyder to action. His situation was now most critical, for, whilst Hyder's troops effectually prevented his procuring provisions by land, the French fleet stopped all supplies reaching him by sea.

On the 10th he wrote to the Council at Madras as follows: "I cannot command rice enough to move either to the northward or the southward. I offered him (Hyder) battle yesterday, but I no sooner showed myself than he moved off, and has taken possession of and strengthened all the roads to the southward. I have written to Nagore in the most pressing terms for supplies. I depend upon every effort in your power; everything must be risked to assist me; my difficulties are great indeed. I need say no more to induce you to take such steps as will enable me to act as a soldier." Hyder had fully expected that the French fleet would have brought a body of troops from the Mauritius, and was much disappointed when he learnt that there were no land forces on board. The result was that M. d'Orves failed to come to terms with him, and the fleet, being in need of water and provisions, suddenly sailed from the coast, leaving the British army free to obtain supplies by sea. Before, however, any arrived the army had become solely dependent for food upon the success which attended the efforts of parties who were employed to discover grain which had been buried in pits. At last, when supplies were received from Madras and Nagore, the transport animals were so reduced in strength that they were unable to carry provisions for more than one day, and the army was thus tied down to the ground on which it was encamped.

Hyder, deeming it inexpedient to attack an army which, in the event of discomfiture, could retire into a fortress immediately in its rear, proceeded to overrun the district of Tanjore, leaving behind a force which he considered sufficiently strong to prevent the British collecting supplies.

Sir Eyre Coote saw no chance of extricating himself from the difficulties with which he was surrounded except by a general action, and this the enemy skilfully avoided. He did not, however, remain inactive, for foraging parties were sent out almost every evening, and, by going long distances and varying the directions in which they were sent, he not only succeeded in getting sheep and slaughter cattle, but also in procuring a few bullocks suitable for draught. Early in April the fort at Tirovadi, sixteen miles west of Fort St. David, was captured by the Trichinopoly detachment. This success was more than counterbalanced by the loss of the English Fort of Thiaghur, which capitulated on the 7th of June, the garrison having expended all their ammunition. On the evening of the 18th an attempt was made to surprise the fortified pagoda of Chillumbrum, situated about thirty miles south of Cuddalore, and which, it was understood, had been stored with provisions by Hyder. The British, however, were beaten off with a casualty roll of six officers and nearly one hundred and fifty rank and file, and Coote proceeded to Porto Novo for battering guns to enable him to renew the attack.

On the 24th Admiral Hughes arrived in the "Superb" with intelligence that Lord Macartney had assumed the government of Madras,* and had brought from England news of war between Great Britain and Holland, and instructions for the immediate commencement of hostilities against the Dutch possession in the East Indies. The Admiral at first proposed a descent upon Negapatam, aided by a detachment of troops, but on examining the resources of the army it was ascertained that, if the detachment could not be back within twelve days, the whole force would be without food. This idea had, therefore, to be abandoned, and it was decided that the whole efforts of the fleet and army should be directed towards the speedy reduction of Chillumbrum.

The extent of the British losses on their attack on the pagoda having been greatly exaggerated in the reports made to Hyder by his officers, he considered that the time had arrived to complete their discomfiture, and directed all his resources to that end. Marching seventy miles in two days he encamped five miles in front of the British camp, which was a little in advance of Porto Novo. It had the sea in its rear and the river Vellaur on its left ; in front, and on the right, were numerous sand hills and ravines, which were at once occupied by the enemy. Hyder having thus effectually barred the road to Cuddalore, it became absolutely necessary to force his position. Coote's situation was again most critical ; in his despatch he says : "Large bodies of the enemy's cavalry, who had from our arrival at Porto Novo hovered round our camp, rendered it impossible for even a single hircarrat to return with any intelligence to be depended on, of either the strength or position of the enemy's batteries. Our grand guard and the other outposts were absolutely the boundary and limited extent of our knowledge respecting the enemy." Under these circumstances all idea of prosecuting the attack on Chillumbrum had to be abandoned ; the battering guns

* He reached Madras on the 22nd June, 1781.

and all other stores were embarked on board the ships, and the Admiral undertook to cover Cuddalore with a portion of his squadron, and with the remainder to watch the operations of the army and embark the remnant in case of its defeat.

Having served out four days' rice to each man, Coote broke up his camp, and moved out at seven on the morning of the 1st July. The road to Cuddalore passed through a plain, and as the enemy's cavalry appeared in force the army was formed into two lines. The first, under Major-General Sir Hector Munro, was composed of two regiments of the Nawab's cavalry, the 73rd Highlanders,* the Bengal and Madras European infantry, five battalions of native infantry and the Trichinopoly detachment; the second, under Brigadier-General James Stuart,† consisted of four battalions of native infantry. The baggage guard was formed of two regiments of the Nawab's cavalry, a battalion of native infantry and some details. After marching in this order for a mile and a half the position of the enemy became clearly visible. To their left was a range of sand hills parallel to the coast and at a distance of above three-quarters of a mile from the sea. Behind their right and centre was a large lagoon, and batteries had been constructed with great skill and judgment, which swept the whole ground over which the British would have to pass.

The army was now halted, and Coote spent nearly an hour in carefully examining the enemy's position, and more particularly the ground to the right of our army, "in hopes," he said, "of its admitting an advance from that point by which we should avoid the enemy's direct fire from their batteries, and have a chance of gaining the left of their posts to turn or otherwise command them." During this period of inactivity the army was exposed to a warm canonnade from the enemy's batteries, but the British could not afford to throw away their shot in reply, "having occasion," wrote Coote, "for every round we had for more decisive service." Fortunately an officer who had been sent on in front discovered a road which had been cut by Hyder through the sand hills to the left of his position for the purpose of dragging guns to a large redoubt situated within four hundred yards of the sea and commanding the ground over which the British subsequently advanced. Happily the redoubt had not been quite finished, and a commanding hill, close to the opening in the sand hills through which the road passed, had not been occupied.

After satisfying himself as to the correctness of the information he had received Coote directed the army to break into column and take

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* Lord Macleod had shortly after Coote's arrival sailed for England, and was succeeded in command of the regiment by Lieutenant-Colonel James Crawford.

† In May, 1776, he was appointed second in command of the troops in the Madras Presidency and posted to the European regiment. He was deeply implicated in the seizure and confinement of Lord Pigot, Governor of Madras, on the 24th April 1776. In April, 1777, consequent on the death of Sir Robert Fletcher, he succeeded to the command of the Madras army, but on the 31st August was suspended by orders from England in consequence of his share in the arrest of Lord Pigot. Owing to technical objections he was not brought to trial until 1780, when he was acquitted on the plea that he had acted under the orders of the majority of the Council, which majority constituted the Government. The finding of the Court was published to the army on the 31st December, 1780, and on the same day he was permitted to return to his duty.

ground to its right, a battalion from the left of each line and eight guns changing front and covering the interval between the two lines, thus protecting their flank. The baggage was ordered to keep close to the shore. In this formation the army moved as rapidly as it could to the eastward, the guns having to be dragged by the sepoys, their bullocks having proved unequal to the task. Skilfully availing himself of the cover afforded from the enemy's fire by the sand hills and a thick hedge, Coote passed through the opening with his first line, drove back a body of the enemy, and then formed line of battle facing to the westward. He had thus placed his first line on the left flank of the enemy's batteries, and had deprived him of the principal advantage of a well-chosen position. The line was now halted under a heavy fire from the enemy's guns, the British hardly firing a shot in reply until the second line should have occupied the sand hills and secured the front line from being attacked in rear. No sooner did Coote see that this had been accomplished than he gave the order to advance. The Mysore cavalry made an attempt to overwhelm the line by a general charge directed diagonally against the left, but the British artillery so long restrained now opened a murderous fire, and the cavalry were repulsed with heavy loss. Coote pressing on forced the enemy's line, and by four o'clock compelled him to retire.

In the meanwhile a strong body of infantry with guns, and supported by a large mass of cavalry, had been ordered by Hyder to fall on the rear of the British. Now was proved the value of the position occupied by the second line, for after a stubborn fight the enemy was compelled to abandon the attempt. Hyder furious at the aspect of affairs ordered all his cavalry to charge both lines simultaneously. The stable horse under his immediate command was to charge the first line, whilst the attack on the second was entrusted to his brother-in-law the Meer Sahib. The first attack was promptly carried out, but was repulsed. Noticing some hesitation on the part of the horsemen directed to attack the second line, he sent orders to the Meer Sahib and other commanders to charge if they valued their heads. Just at this moment the Meer Sahib fell mortally wounded, and a small schooner, which had stood in as close to the shore as soundings would permit, poured a broadside into the cavalry, who, imagining that they were about to be exposed to the fire of the whole fleet, were seized with panic and galloped to the rear.

The repulse of the cavalry, combined with the continued advance of the British commander with the first line, induced Hyder to listen to the advice of some of his officers, and to order the successive retreat, first of his artillery, then of his infantry, and lastly of his cavalry. Coote pushing on halted on the ground the enemy had abandoned, and about midnight was joined by the second line and the baggage. After burying the dead, and paying every possible attention to the wounded, the army pursued the road by which the enemy had retired, and passing through a deep ravine encamped on the north-west side of it, close to the village of Mootypollum, the name by which the Mysoreans call the battle, as Porto Novo, from whence the British marched in the morning, is made to designate the action in the British narratives.

The disparity between the strength of the forces engaged was very great. The English all told numbered only 8,476, *viz.*, cavalry, 830; artillery, 598; infantry, European and native, 7,048 with 55 light field pieces. Hyder's army, according to the lowest computation, amounted to 80,000 men,* of whom 600 were Europeans and 1,000 Topasses, or others dressed in European clothes, with 47 guns of heavy metal. The disparity in the losses of the two armies was still greater, for, whilst those of the British were only 306 killed and wounded, that of the Mysore army was said by a careful historian, like Wilks, to have numbered 10,000. The heavy loss he attributes to the deadly effect of the British artillery fire on the densely-packed masses of the enemy.

In the report of the action which Coote forwarded to Government he thus refers to those under his command on this eventful day: "I was well seconded by Major-General Munro, who commanded the first line. His spirited and active conduct contributed much to our success. Brigadier-General Stuart, who commanded the second line, and had orders to defend the heights, performed that service much to my satisfaction."

"Every individual of this little army seemed to feel the critical situation of our national concerns: our falling interests required uncommon exertions for their support, and to the honor of this army every nerve was exerted to the very extent of possibility."

"The only difficulty was to restrain the ardour of the troops within prudential bounds. Eager to advance, it became particularly necessary to guard against accidental disorder, situated, as we were, with multitudes of cavalry against us on the watch to take advantage of hurried or confused movements."

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"The spirited behaviour of our sepoy corps did them the greatest credit. No Europeans could be steadier; they were emulous of being foremost on every service it was necessary to undertake."

The importance of the victory of Porto Novo can hardly be overestimated, for, if the army under Coote had been defeated, every British post in the Madras Presidency, including most probably Fort St. George itself, would have fallen to the enemy. No assistance could have been afforded from Bengal, for in addition to the troops under Goddard, which had been sent to the Western coast, another large detachment of native troops under Colonel Pearse was now on its way to reinforce Coote. The political outlook was most threatening; we have already seen how intelligence of the destruction of Baillie's detachment had caused a change in the disposition of the Rajah of Nagpore. A second reverse to our arms would undoubtedly have been followed by a general

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* This is the number given by Wilks. Munro in his narrative estimates the strength of the enemy at 100,000. Coote in his despatch says that an intelligent Portuguese officer, who came over to the English at the beginning of the action, informed him that the strength of Hyder's army was nearly as follows: Artillery 47 pieces well served, 620 Europeans, 1,100 Topasses and others in European dress, cavalry 40,000, twenty-three battalions of sepoys, numbering 18,000, irregular footmen armed with matchlocks and rockets 120,000. Total 179,720.

and active combination of the native powers against the British. Even now a strong body of Nagpore horse was in close proximity to Pearse's detachment, and their uncertain attitude at times caused that officer much anxiety.

To aid the other presidencies Hastings had so denuded Bengal of troops that the number of European soldiers who remained barely exceeded five hundred, and they were dispersed throughout the Presidency. No reinforcements could be expected from home, for England was engaged in a conflict with her revolted colonies, as well as with France and Spain. In this emergency Hastings, deeming that more European troops were absolutely necessary for the safety of the English possessions, entered into negotiations with the Dutch East India Company for the hire of twelve hundred of their European soldiers, who were mostly Germans. The negotiations led to no satisfactory result, for the Dutch procrastinated, and, before a treaty could be drawn up and ratified, Holland had joined the coalition against Great Britain. Hastings' conduct in this matter has been subjected to much hostile criticism. His biographer admits that the terms offered were high. "They not only included the pay of the troops while employed but the cession in perpetuity of the province of Tinnevelly, together with permission to make conquests in the neighbourhood of Cochin, and an exclusive right to the pearl fishery along the whole of the coast south from Ramesvaram." The Madras Government to its honor vehemently objected to these terms.

After the action two objects demanded Coote's immediate attention. The first was the relief of Wandiwash, which had been invested by Hyder's son Tippoo on the 22nd June; and the second, to effect a junction with Colonel Pearse's detachment, which had reached Nellore. The necessity for immediately relieving Wandiwash induced Coote as soon as possible after the battle to move to the northward, receiving his supplies from the ships. Hyder retired slowly before him but on every successive day's march Coote had reason to conclude that he was preparing for another general action. On reaching Pondicherry, Coote moved out towards the enemy's camp for the purpose of bringing on an engagement, but Hyder struck his tents and moved off to the westward, and Coote now quitting the sea coast moved first to Permacoil and then to Carangooly. Here he heard that on the 19th July Tippoo had raised the siege of Wandiwash, and having been largely reinforced had marched to intercept the Bengal detachments. Nothing now remained to prevent Coote from marching to join the troops from Bengal. He, therefore, moved by Chingleput to St. Thomas' Mount, where for the present we will leave him.

PART II.

A fortnight after Coote had sailed from Calcutta, Hastings decided to still further reinforce the troops on the coast, and directed that six battalions of sepoys and a company of European artillerymen should march *viâ* Cuttack to Madras. Lieutenant-Colonel Thomas Deane

Pearse,* Commandant of the Bengal artillery, was appointed to the command of this detachment. The troops were ordered to assemble at Midnapore, whither Major Edmonstone, the second in command, proceeded at once, while Lieutenant-Colonel Pearse remained at Calcutta to be in close communication with Brigadier-General Giles Stibbert, the Provincial Commander-in-Chief, and to hasten the despatch of the necessary stores. Shortly after the orders for the assembly of the force had been issued, a new organisation of the Bengal native army, combined with a considerable increase in its strength, was ordered to be carried into effect from the 1st January, 1781.

Under the new organisation the army was to consist, exclusive of the battalions with Goddard, of thirty-six regiments of two battalions, and each battalion of five companies of one hundred rank and file. A major commandant was placed at the head of each regiment. The battalions were to be commanded by captains, and the companies by lieutenants. A lieutenant was appointed adjutant of each regiment, and a native warrant officer adjutant of each battalion. Two European sergeants were posted to every battalion as sergeant-major and quarter-master-sergeant, and the appointment of native commandant was ordered to be gradually abolished. It was further directed that the pay of each battalion was to be drawn in one abstract by the captain commanding, and that it was to be issued in the presence of lieutenants commanding companies, for the due performance of which duty they were to be held responsible, and were required to make a report and declaration on honor in writing that the men had been duly paid. An abstract of the Articles of War relating to mutiny and desertion was also for the first time promulgated, and it was ordered to be translated into Hindustani and read once a month to every battalion.

Although by the new regulations the number of officers in the rank of major had been very considerably increased, and the promotion of the officers generally much accelerated, the supervision now ordered to be exercised over the commanders of battalions, and more especially the order relative to the payment of the men, was the cause of much discontent amongst the captains. As regards the first-named cause of dissatisfaction, it must be admitted that the captains had grounds for complaint, for a long time elapsed before any rules were laid down defining the powers either of a commander of a battalion or of a commandant of a regiment. In the meanwhile each major acted in

* Born 1742. In his fifteenth year he was admitted as a cadet to the Royal Academy at Woolwich, and on the 8th June, 1757, obtained his commission as lieutenant fireworker. He served with the expedition to the coast of France in 1758, at Martinique and Guadaloupe in 1759, siege and capture of Belleisle in 1761, and siege and capture of Havannah in 1762. In 1768 he was appointed major in the East India Company's artillery on the Bengal establishment, and landed at Calcutta on the 26th August of the same year, and may be considered the first professionally-educated artillery officer who entered the Company's service. On the 24th October, 1769, he was promoted to lieutenant-colonel Commandant. He was an intimate friend of Warren Hastings, and was his second in the duel he fought with Mr. Philip Francis on the 17th August, 1780, Lieutenant-Colonel Watson (the Commandant of Engineers) being second to Mr. Francis.

accordance with his own ideas, and the want of well-defined rules on this subject led, as we shall shortly see, to much unseemly squabbling between the majors and captains of Pearse's detachment.

With reference to the new rules for the payment of the men the case was different. Hitherto the officers commanding battalions had been entirely uncontrolled in all matters connected with the payment of their men. The legitimate income of the officers was comparatively small, and many did not scruple to add to it by defrauding the State by making it pay for men who only existed on paper, and by withholding from those under their command money that was justly their due The evil was notorious, and many proposals had been made for putting a stop to it, but nothing had ever been really done to check it. The result of these malpractices was that, at a time when the services of the army were urgently needed, a strong spirit of dissaffection prevailed in many regiments, solely attributable to the injustice with which the men have been treated in matters connected with their pay and prize money. Already one of the battalions under orders for Midnapore, the 19th, commanded by Captain Peter Grant, had mutinied, the men complaining that Captain Grant had withheld their proper share of prize money for the capture of Chandernagore in July, 1778. In this emergency, taking advantage of a considerable augmentation of the army and the opportunity thus afforded of promoting many of the old commanders of battalions, Brigadier-General Stibbert drew up a scheme for the reorganisation of the army and rules for the payment of the men. Hastings approved of Stibbert's proposals, and without consulting Sir Eyre Coote ordered them to be carried into effect.

Having completed as far as possible all the arrangements which had required his presence in Calcutta, Pearse started on the 9th January, 1781, for Midnapore, where he arrived on the 11th. Shortly before his arrival orders had been received for the disbandment of the 19th battalion and for the men to be distributed amongst the other corps of the detachment. No sooner had this order been made known to the men than they began to desert in large numbers. A Court of Enquiry was directed to assemble to enquire into the grievances of the men of the battalion, and resulted in Major Grant—he had been promoted from the 1st January—being tried by court-martial for defrauding his men of their pay and for making false returns. He was found guilty and cashiered.

The force assembled at Midnapore was as follows: One company of European artillery and one of native; one hundred Mogul horsemen who had been enlisted by Major Edmonstone; the 12th Regiment Native Infantry, Major Edmonstone; the 13th, Major Blane; the 24th, Major Kilpatrick; the 25th, Major Wedderburne; and the 26th, Major Byrne. Sixteen pieces of ordnance were attached to the force, but Pearse wrote from Midnapore requesting that the number might be increased to twenty 6-pounders, being two for each battalion, with four 12-pounders and four howitzers in addition.

The transport consisted of elephants and bullocks. Each camp follower was armed with a spear, and wore a distinguishing metal badge, on which was engraved the number of the corps or the name of the department to which he belonged.

As was customary at the time no tents were provided for the men, but a bell tent was supplied for the preservation of the arms of each company. The officers were supposed to be provided with tents at the public expense, of a pattern which had been approved by Coote, but, owing to the recent increase to the army and other causes, when Pearse reached Midnapore many officers were without tents, and they begged that they might be allowed to make up tents for themselves, receiving the cost of the same from Government. After much delay this was sanctioned, as a temporary arrangement. Pearse strenuously advocated that the existing system should be abolished, and urged that officers should provide their own tents and carriage for the same, receiving a monthly allowance, both in quarters and in the field, to enable them to do so. At last, during the administration of Lord Cornwallis, his representations were successful, and a monthly sum, known as tentage, was allowed to be drawn by every officer, and this arrangement has continued to the present time.

In the meanwhile the attitude of the Mahratta Chief of Nagpore had been a source of anxiety. A large body of his cavalry under Chimnajee Bappoo, his second son, was now in Orissa, and it was feared that, in the event of the British army on the coast suffering another reverse, Chimnajee would invade Bengal. His force, moreover, occupied a portion of the country through which Pearse would have to march. Under these circumstances Hastings, acting on the principle that "self-distrust will never fail to create a distrust in others and make them become your enemies," for, as he continued, "in no part of the world is the principle of supporting a rising interest and depressing a falling one more prevalent than in India," sent Mr. Anderson to Chimnajee to request him to move his troops from the line of Pearse's march lest it might lead to hostilities, and further to request Chimnajee to furnish the detatchment with supplies.

Shortly after Pearse received instructions to commence his march, but was directed not to cross the Subanrekha river until he had received further orders. He accordingly marched from Midnapore on the 21st January. Desertions now became frequent, the deserters being chiefly men who had been drafted from the 19th battalion. Several were caught and tried, but Pearse was averse to carrying out the sentence of death passed upon them, and wrote to General Stibbert soliciting a general pardon. "It is my opinion of the natives of this country," he said, "that they are soldiers at heart, and may with proper management be made as fine soldiers as any in the world." He had at this time to issue very stringent orders on the subject of musters, and in reporting what he had done says: "I have put every sepoy in the way of knowing his rights, which were always hidden before by every artifice." In a subsequent report he writes: "It has given umbrage that I have counted the files of every regiment, for it is asserted that now officers sign

upon honor, which was not the case before, and those who have the payment have no possible emolument from false musters. Admit the principle, the consequence is that the appearance of the commanding officer upon parade is useless, and he can never muster troops under his command at all." He concluded his letter by soliciting instructions as to how the muster of troops was to be taken.

On the 9th February, satisfactory arrangements having been made with Chimnajee, the detachment crossed the Subanrekha river into Mahratta territory. The crime of desertion had hitherto been leniently treated, but so greatly had it increased that Pearse determined to make an example. The next man who deserted and was caught was tried by a drum head court-martial in the centre of the troops paraded for the purpose, sentenced to death and executed on the spot. He had no excuse wrote Pearse in his report; "he delivered Rs. 32 to me for his family." The force remained in camp on the south bank of the Subanrekha river until the 11th, when it resumed its march, and reached Balasore on the 14th. In a letter dated 16th February Pearse says: "I am passing through a country as little known as if it were in the midst of China. We always understood that the country from Jellasore to Balasore was a wilderness, but I found the country in the highest state of cultivation. I followed the bullock road by the track of their feet; they must have passed in thousands to have beaten it so much."

The detachment forded the Mahanadi on the 28th February, and encamped on the bank of the Katjuri river, which was on the southern side of Cuttack island. From hence Pearse reported that he had 273 sick and only 4,409 effectives, and solicited that he might get drafts from the Circar battalions at Ganjam on arrival at that place. On the 2nd March the force marched from Cuttack, and a heavy fog coming on many of the bazar people took advantage of it to desert, and no less than eighty sepoys deserted in twenty-four hours. In order to stop the desertions Pearse promised that on arrival at Jagannath the expenses of the men visiting the temple should be paid. This promise had the desired effect,

The force arrived at Jagannath on the 7th March, and, as it was the Holi, remained there until the 11th. In a letter from this place Pearse gives it as his opinion that one of the principal causes of the desertions was the expense the men were put to for food, having to pay for everything "without hope of the chance of recompense by plunder; yet they only receive the same sum as in cantonments without any addition." Three days after he wrote: "Another objection was, we had no cowries or pice*—coins of a denomination of which our people had never before heard, and which, therefore, we could not provide. Before we had been where such money passed as we possessed, yet there is no one here to change our money into their coins.

Hitherto the chief difficulties with which Pearse had to contend were

* In the "Lives of the Lindsays" it is stated that in 1780 the revenue of the Sylhet district was Rs. 2,50,000, which was paid in cowries. The cowries were sent to Dacca, where they were exposed for sale.

the insubordinate spirit rife among the British officers consequent upon the new regulations and the disinclination of the sepoys for the service on which they were engaged, chiefly due to the manner in which they were treated by Government. But now a severe epidemic of cholera was to increase his difficulties, and, as this is the first occasion of which we have any record of our troops having suffered from cholera, every detail connected with the epidemic is of peculiar interest.

On the 17th March the force reached Ganjam, halted there until the 21st, and then resumed its march. Its effective strength was 4,049 ; the sick amounted to 325, and 31 men were on detachment. The next day Pearse reported as follows to the President of the Secret Committee at Madras: "I marched from Ganjam this morning, though we were far from complete in those aids that were necessary, such as coolies, bearers for the hospital, &c., yet such a fatal sickness broke out suddenly in the army as alarmed me beyond measure. Men in perfect health dropped down dead in numbers. The cause is unknown ; it was attributed to the bad effect of the water, also to the violence of the sea wind. I suppose both causes operated, but be the cause what it may, I know of no remedy but marching forward. It is necessary to apprize you that by my return I am seven hundred short of my complement, and I have, since the sickness broke out, full five hundred sick in hospital." The next day, the 23rd, he wrote to Hastings : " I beg leave to tell you that my army has met with a disaster which no foresight could guard against ; in short, the whole have drunk poison ; great numbers are dead and many are dying. It seems the people here use euphorbium juice for soap, and our people not knowing it drunk out of the ponds in which they washed ; many dropped down dead ; however those are recovering who did not take very large doses, but almost all the servants, drivers and coolies have run away, and I shall be forced to halt a few days at Ichapore. It was only this morning by accident that I learnt the cause assigned for this dreadful attack, and have taken precautions against it." A day or two after, writing to Coote, he said: " We have now nine hundred sick. * * * * When the disease attacked our people some fell down dead ; others were seized with violent vomitings and purgings and died ; others died from violent spasms in the bowels ; but we are now recovering, for those who fell down yesterday and to-day were not affected so violently, which shows that our marching on has had a good effect."

On the 24th March Pearse reached Ichapore with nearly half his force either on the sick list or in a weakly condition. Here he assembled the commanding officers to deliberate upon the best means for protecting the men from the prevailing sickness. In a letter which he submitted for their consideration he says : " The calamity will inevitably increase as we advance, for the winds and dews seem to be the cause of it, and not the water as was supposed, nor the provisions. * * * Our men are totally unprovided for the climate ; they have no tents, and in general not even blankets to protect them from the inclemency of the season. Had I been acquainted with the nature of the clime the calamity might

probably have been prevented by an application for tents."* The result of the deliberations of the commanding officers was that a number of the inhabitants were turned out of their houses and the sepoys placed in them.

As there were only two doctors with the force Pearse applied for permission to employ in a medical capacity the well-known M. Claude Martine, who represented that he had been educated as a surgeon and who had followed the force from Calcutta, and was ever ready to offer himself in any capacity when the wants of the service presented an opening for employing him. Pearse's application was complied with.

In a letter to Hastings, written on the 26th March, Pearse wrote : "I have just seen Dr. Gillies, who tells me that he has opened some of the bodies, which had every appearance of having suffered from a strong poison. Excuse contradictions ; they are only about things of conjecture and things I do not understand. The preceding part of the letter was written yesterday and the day before. I have now the satisfaction to say that we are fast recovering, but we have 1,136 sick." Hitherto the sickness had been confined to natives, but on the 28th March Pearse reported that the Europeans were beginning to suffer.

The force marched from Ichapore on the 1st April, leaving 320 sick behind, but the halt and shelter had been attended with the most beneficial results, and Pearse determined that, until the men should be provided with tents, he would on all possible occasions quarter them in villages. On the 3rd April he entered the Chicacole district and wrote to Hastings : "I have this day overcome the deserts of Ganjam and entered the Chicacole district. My men are fast recovering. Desertion swept off a good many, but it is abated, and after all we have 3,955 fighting men, so if we get drafts to complete us we shall do very well. The post was general throughout these districts,† though I knew it not. We reached Ganjam just as the equinox and the long shore winds blew death and dismay in our faces, hence the desertions."

As has already been said, the order directing the new organisation of the army did not clearly define the respective powers of majors commanding regiments and of captains commanding battalions Pearse in his letter of the 3rd April refers to the constant wrangles between the

* Small tents were supplied by Government for the protection of the arms of the Bengal sepoys when on the march, but it was not until 1797 that tents were provided for the men. In Madras from an early period the men provided themselves with tents. In October, 1780, tents were furnished to the sepoy battalions by Government ; each tent held 50 men, cost Rs. 112-8, and was carried by two bullocks.

† Hastings in a letter to England, dated 28th April, 1781, writes thus regarding the detachment : "What follows is too horrid to detail ; a contagious distemper seized the detachment at Ganjam, and threatened to annihilate it. It exactly resembled the disorder called Mordeche, or Mordecheen ; in Europe, Cholera Morbus ; but seems to be a species of the plague, and to have been caused by exhalations from the rains, which had fallen most incessantly and with great violence during two months It has travelled since to Calcutta, where it made an alarming havoc for about ten days By a report which I ordered to be made to me, of the number and names of inhabitants who perished by the distemper between the 11th and 21st of this month, there appears to have died in all 879, multiplied by reports into many thousands. The weather has cleared and the mortality abated." Life of Warren Hastings, Vol. II, p. 359.

majors and captains; "the latter," he wrote, "want to make the former cyphers." He instanced the case of Major Kilpatrick, who had raised a battalion and now commanded the 24th Regiment, N. I. He ordered the two captains commanding battalions of the regiment, *viz.*, Sandford and Scott, to send the native officers to his tent in order that he might ascertain the cause of the desertions. At this the captains took offence, and denied that the major had the right to issue such an order. Captain Sandford was the more violent of the two, and instigated, it is said, a subaltern to put a subadar under arrest, who had gone to Major Kilpatrick. Pearse sent for the two captains, released the subadar, and ordered Captain Sandford to apologise.

In the letter before referred to he urged that sircars in regiments should be abolished and reports collected from orderly havildars. He then continues: "That I may carry 3,500 men to Coote is the utmost of my wish, and I think he will have no reason to wonder there are no more when he considers the great distance, without a single day's plunder to keep the men in temper, or a single day's fight to divert their minds from a country that seems made up of the *shreds and fragments of a world, in Dame Nature's shop, producing nothing but sand and craggy rocks, brackish water and pestiferous winds.* * * * * * * * * * * We have not in the whole army sixty of the drafts* we received, which shows that we should have been much stronger if we had had another regiment instead of them, and if we had been formed on the esplanade as I begged and entreated, we should have had tents, and our army would not have been exposed to these terrible winds and dews. * * * * * * * * * * * * * * The surgeon who came to us from Ganjam was taken ill the morning before last, and he was dead before 9 P.M. of this disorder; if we lose another we shallbe undone."

The force reached Vizianagram, which Pearse described as a land of plenty, on the 11th. Here he was informed that he would be joined by 2,000 Mahratta cavalry, whom Chimnajee, in accordance with a treaty concluded with Mr. Anderson on the 6th April, had agreed to furnish, receiving a lakh of rupees per month in return for their services. Here, too, twenty deserters rejoined, and Pearse sent out a proclamation of pardon to all who would give themselves at places within his reach. After a halt of ten days the detachment marched for Ellore.

From a return sent to Coote, dated Vizianagram, 20th April, 1781, the strength of the force was as follows:—

European company of artillery—1 captain, 1 captain-lieutenant, 4 lieutenants, 5 lieutenant fireworkers, 1 adjutant and 1 quartermaster. Total number of officers, 13. The number of non-commissioned officers and men was: 1 sergeant-major, 1 quarter-master-sergeant, 4 sergeants, 6 corporals, 3 drummers, 80 bombardiers and gunners; there was also 1 commissary and 1 conductor, who ranked as non-commissioned officers. Golunday company—2 jemadars, 8 havildars, 8 naicks, 2 drummers, 82 golundays. Troop of native cavalry—1 captain, 2 jemadars, 2 duffadars, 21 troopers.

* Chiefly from the disbanded 19th Battalion.

Present state of the five Battalions of Native Infantry.

Five Regiments of Native Infantry.	British Officers				Battalion Staff Effective.								Drummers.	Subadars.	Jemadars.	Havildars and Sepoys.	Total Native Officers, Drummers, Havildars and Sepoys.	Wanting to complete Havildars and Sepoys.
	Majors.	Captains.	Lieutenants.	Ensigns.	Sergeant-Majors.	Drill Sergeants.	Quarter-Master-Sergeants.	Native Commandants.	Havildar-Majors.	Sircars.	Doctors (Natives).	Native Adjutants.						
	5	10	36	5	9	8	10	3	10	50	19	10	59	50	96	3747	3,942	1,253
Total ...	56				119								59	50	96	3747	3,942	...

The sick, both those who were in camp and those who had been left at different places on the road, were included in the above. They numbered 5 subadars, 7 jemadars, 5 drummers, and 815 havildars and sepoys.

The disputes between the captains commanding battalions and the majors commanding regiments continued. Captain Pearson and Lieutenant Vanrizdell, commanding battalions of the 25th Regiment, Native Infantry, complained that Major Wedderburne had forbidden them to parade their battalions for manœuvre without his permission. This they contended was contrary to the regulations. Pearse upheld Wedderburne on the ground that officers commanding battalions were not independent of the officers commanding the regiment.

On the 29th April Pearse in a letter addressed to Hastings attributed the desertions to a certain extent to the disputes amongst the officers, and to the fact of young officers having by the new regulation been placed in command of corps, and not being acquainted with the men, passed over veterans for promotion, promoting petty boys instead.

This caused great dissatisfaction. He concludes this letter by saying he had not heard a word of the Mahrattas, and that, if they did not join the army in May, they would not be able to do so that year, as the Kistna would be in flood and bar their junction.

On the 7th May the force reached Peddapur. Here Major Kilpatrick placed Captain Sandford under arrest, and Pearse deemed it necessary to order the trial of the latter by court-martial, and Major Edmonstone was appointed president of the court. The officers commanding battalions sent an appeal to General Stibbert against Pearse's ruling as to the powers of officers commanding battalions. One of their complaints was that majors had the power of appointing havildars. The regulations laid down that captains commanding battalions should exercise the power of lieutenant-colonels, and majors that of colonels, and it was argued that, as colonels commanding European regiments did not appoint sergeants and corporals, majors commanding native

regiments should not have the power of appointing havildars. Formerly colonels commanding brigades had been invested with the power of promoting to the rank of havildar, but it was said they delegated the power to the officers commanding battalions. Some letters and paragraphs having appeared in *Hickey's Gazette* abusing Pearse and the majors, Hastings prohibited the post office from carrying any newspapers or packets to the force.

After a halt of seven days at Peddapur the detachment resumed its march, and arrived at Ellore on the 20th. In his reports from this place Pearse wrote: "I am constrained not to have heard of the Mahratta horse. We must cross the Kistna before the 2nd of June, and if we there wait for the Mahratta horse we shall eat up all our supplies; if to avoid this we push on the horse may never join. I have stated all this to Coote, who has ordered me to Nellore. This was before he had heard of the Mahratta horse."

In the same report he states that the Hindoos in his army were nine out of every ten, but that twenty-nine Hindoos had deserted for one Mahomedan. This he attributed to the fact that the Hindoos stinted to save money, as much as from 65 to 110 rupees having been found on those that died. The Mahomedans, on the other hand, lived well and spent their money, and therefore the service had a tie upon them which it had not on Hindoos. For this reason he recommended that all possible encouragement should be given to Mahomedans to enlist, and that we should "cease to seek for tall smooth-faced Hindoos and get shorter and rough-faced Mahomedans."

On the 30th May the force crossed the Kistna, and on the 1st June numbered 3,000 men under arms, and shortly afterwards was joined by two Circar battalions from Masulipatam. A large number of bullocks had been taken on from Ellore for Coote, who was much in want of them to drag his artillery and carry his provisions, but owing to want of grain 1,600 of them had to be left behind on the road. The detachment was detained on the south bank of the Kistna until the 11th June, waiting for supplies of money, cattle and provisions. Resuming its march it reached Nellore on the 25th June.

From Midnapore to Nellore the distance is 645 miles. The whole of the route was most carefully surveyed. The distances were measured with a pèrambulator, and Pearse himself for some time took the observations for latitude and longitude, but latterly this duty was performed by Lieutenant Colebrooke, the future Surveyor-General.

From Nellore Pearse wrote to the President of the Secret Committee at Madras as follows: "The Foujdar has got a great deal of grain, more than I can carry, for I have only brought about 5,000 bullocks from Masulipatam, and of these many are hardly able to bear loads. We have besides 1,200 draft bullocks, of which 280 are worth little and 350 for slaughter; these must be for your army. They wanted to deliver me large flocks of sheep, but I declined taking them, because they would only encumber me and perish on the road. The Foujdar has 2,000 bullocks ready for us. Experience has confirmed me in the opinion I have always strenuously urged that all ammunition ought to go in carriages, for the

draft bullocks we brought with us are better than when they set out; yet all the pack cattle are nearly disabled from sore backs, yet they can all be put to the traces. The magazine bullocks are a subject of eternal vexation; carriage can go where guns can."

The Madras Council having nominated an officer to command the troops of that Presidency with the detachment, Pearse appointed Major Edmonstone to command the Bengal troops.

Pearse remained at Nellore until the 23rd July, when, in accordance with instructions from Coote, he marched for Pulicat, the sick, some heavy guns and a Circar battalion being left behind. The ordinary road from Nellore to Madras passes to the westward of the lake of Pulicat at the distance of from ten to fifteen miles from the sea; there was, however, a shorter route along the shore which was sometimes preferred by travellers lightly equipped. Tippoo, who had been sent by his father to intercept the Bengal detachment, did not deem the latter route practicable for troops, and whilst he was preparing various impediments to the progress of the detachment by the upper road, Pearse, under instructions from Coote, was marching by the sea shore. Coote, unwilling to risk the separate movement of the corps for the last thirty miles, marched to the fort of Pulicat on the northern bank of the lake, and there, on the 3rd August, 1781, effected a junction with the reinforcement from Bengal. Coote, with his army thus reinforced, then returned to the Mount.

PART III.

By an order dated 8th August, 1781, the army was now brigaded as follows:—

The four regiments of cavalry to form a brigade of cavalry.

1st Brigade of Infantry.	*Field Officers.*
1st Battalion H. M. 73rd Regiment. Bengal European Infantry Regiment. 2nd Battalion 1st Madras Infantry.	Lieutenant-Colonel Crawford,* Majors Elphinstone and Mackenzie (H. M. 73rd Regiment), Major MacGowan (Bengal).

Lieutenant Braggs, 73rd, Major of Brigade.
Nine 12-pounders and five howitzers.

2nd Brigade of Infantry.	*Field Officers.*
12th and 25th Regiments Bengal Sepoys. 8th, 16th and 21st Carnatic Battalions.	Lieutenant-Colonel Ross Lang† (Madras), Major Edmonstone (Bengal).

Lieutenant Richardson (Madras) Major of Brigade.
One 18-pounder, one 5½-inch howitzer, ten 6-pounders.

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* Succeeded Lord Macleod in the command of the 73rd Regiment.
† Was at this time commanding at Vellore, and did not join the army in the field until later on.

3rd Brigade of Infantry. — *Field Officers.*

13th Regiment Bengal Sepoys.
"Trichinopoly Detachment,"* and the 9th, 17th and 18th Carnatic Battalions.
— Lieutenant-Colonel Pearse (Bengal), Major Blane (Bengal).

Captain Williamson (Bengal) Major of Brigade.
One 18-pounder, one 5½-inch howitzer, ten 6-pounders.

4th Brigade of Infantry. — *Field Officers.*

24th Regiment Bengal Sepoys.
2nd and 4th Carnatic Battalions.
7th and 8th Circar Battalions.†
— Lieutenant-Colonel Owen, Major Kilpatrick (Bengal).

Captain John Grant (Bengal) Major of Brigade.
One 5½-inch howitzer and ten 6-pounders.

5th Brigade of Infantry. — *Field Officers.*

26th Regiment Bengal Sepoys.
4th, 15th and 20th Carnatic Battalions.
— Lieutenant-Colonel Brown (Madras), Major Byrne (Bengal).

Lieutenant Oliver (Madras) Major of Brigade.
One 5½-inch howitzer and ten 6-pounders.

On the 9th August Pearse forwarded for the orders of Sir Eyre Coote the proceedings of the court-martial upon Captain Sandford. The prisoner was sentenced to be reprimanded. Coote confirmed the sentence, and directed that he should be reprimanded by Colonel Pearse in the presence of Majors Blane and Wedderburne. Captain Sandford accordingly attended at Colonel Pearse's tent, was reprimanded, and released from arrest. He immediately proceeded to his own tent, put on his sword, and returning to Colonel Pearse's challenged him to fight a duel. For this Captain Sandford was again placed in arrest and again tried, but the result of the trial cannot be traced.

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* This was the detachment under Lieutenant-Colonel Cosby which joined Sir Hector Munro at Chingleput after the retreat of the army from Conjeeveram, and was thereafter borne on the returns of the army as the "Trichinopoly Detachment." It consisted of two regiments of native cavalry under Captain Jourdan, the Grenadiers of the 9th, 13th and 18th Battalions from Tanjore, the Grenadiers of the 6th and 19th Battalions from Trichinopoly, and three battalion companies of the latter battalion. These battalions are represented by the present 6th, 9th and 13th Regiments of Madras Infantry—see note, p. 2, Vol. II of Wilson's History of the Madras Army.

† By an order dated 16th June, 1769, the native troops on the Madras establishment which served in the South were designated "Carnatic Battalions," and those in the North "Circar Battalions." These distinctions were abolished in October, 1784, and it was directed that all battalions on the establishment should be known as "Madras battalions."

The force under Coote now numbered close upon 12,000 men, and would, if it had been properly equipped, have been ample for the service it was required to perform. The transport and commissariat arrangements, however, were lamentably defective. The cattle for draft purposes brought by Pearse from Ellore and other places were wild from pasture, and had to be trained before they could be of any use, while of the cattle officially reported to have been collected at Madras during the absence of the army not one-half was forthcoming. After a searching enquiry into the resources of the army it was ascertained that, exclusive of what could be carried by the men themselves, it was impossible to carry supplies sufficient to last the army for more than one and a half days. It was, therefore, deemed impracticable to attempt either of the great objects of the campaign—the relief of Vellore, or the siege of Arcot.

Coote now decided to attempt the capture of the fort of Tripassore, situated thirty-three miles to the westward, on one of the roads leading to Arcot and Vellore. Poonamallee, an intermediate place, was still in the hands of the British. By encamping between Madras and Poonamallee, and again between the latter place and Tripassore, Coote calculated that, by employing all the cattle at his command, he would be enabled to carry to the front a sufficient quantity of supplies for the object he had in view. On the 19th August he arrived before Tripassore, which was garrisoned by fifteen hundred men. On the 22nd, a good practicable breach having been effected, preparations were made for the assault. The garrison now offered to surrender on terms they had previously refused. The offer was rejected, and the enemy's commander was told that he must surrender unconditionally within a quarter of an hour, or stand the consequences of an assault. Scarcely had this message been despatched when news was brought that large bodies of the enemy under Hyder were in sight. Not a moment was to be lost; orders were at once given for the assault; but as the troops emerged from the trenches the flag of truce returned with an acceptance of the terms imposed, and the assailants ascended the breach without opposition. Hyder retired as soon as he learnt that the place had surrendered.

Ever mindful of the number of British subjects in the hands of Hyder Coote now proposed to exchange the garrison of Tripassore for an equal number of British soldiers in confinement in the dominions of the ruler of Mysore. "The men taken at Tripassore," said Hyder in his reply, "are faithless and unworthy; they know that they dare not approach me; they are your prisoners, and I advise you to put every one of them to death speedily." Coote unable to feed his prisoners was compelled to release them, making them, however, go through the form of promising not to serve against the British during the continuance of the war.

The store of grain found in the fort was so trifling that, on the night of its capture, it was necessary to send a convoy to Poonamallee for a fresh supply. Hyder in the meanwhile had retired near to Perambakum, the place where he had annihilated Baillie's detachment in the preceding September, and considering the spot a lucky

one he decided to remain there and accept battle from the British. Coote hearing of this, and anxious to obliterate the remembrance of Baillie's defeat, determined to accept the challenge. Sending his baggage and some of his heavy guns into the fort of Tripassore, and with each of his men carrying six days' supply of rice, he marched to Perambakum on the morning of the 26th. While the troops were preparing to encamp Coote with his personal guard* advanced to an eminence 2½ miles distant to reconnoitre the enemy's position. From this eminence he could see Tippoo's encampment. He was then striking tents, and shortly after his troops marched off towards Pollilore.

At daybreak on the 27th the army again advanced, two regiments of cavalry, the 8th Carnatic battalion with its guns and the General's own guard with their galloper guns forming the advance guard under Lieutenant-Colonel Brown. The baggage was on the right flank protected by the Mogul horse, a battalion of the Nawab's troops and the men belonging to the Vencataputtyraze raja. Two regiments of cavalry and the 24th Bengal sepoys formed the rear guard, which was commanded by Major MacGowan. The army marched by files ready to form two lines. The first commanded by Major-General Sir Hector Munro was leading. It was composed of the 1st, 2nd and 3rd brigades, commanded respectively by Lieutenant-Colonels Crawford and Pearse, and Major Edmonstone. The second line followed, commanded by Brigadier-General Stuart, and consisted of the 4th and 5th brigades under Lieutenant-Colonel Owen and Captain Davis, who commanded the 5th brigade during the time Lieutenant-Colonel Brown was in command of the advance guard.

The army advanced in this order above six miles, when it entered an avenue of banyan trees on the Conjeeveram road. Proceeding a little over three miles up this road the advance guard reported at about 9 o'clock that the enemy was in force in front and on the right flank. Just at this time a strong land wind accompanied by dust suddenly sprang up, and blowing right in the faces of the British completely obscured distant objects.

Immediately opposite to and stretching along the right of the British was a plain covered with thick jungle, and here and there intersected by watercourses. On the left was also a plain—the spot where the fate of Baillie's detachment had been decided. This plain was cut up by much deeper watercourses than that on the right. At its further end a mile to the front, and distant one thousand yards from the avenue, was the ruined village of Pollilore, from which the action which ensued takes its name. Six hundred yards to the left of the advance guard was a tope of trees, with a watercourse on its right and front. At once perceiving the importance of this tope, Coote ordered the 8th Carnatic battalion with its guns to occupy it. The enemy seeing this opened fire from two or three guns on the tope, and a Bengal regiment was ordered to be ready to support the Carnatic battalion.

* A weak troop of European cavalry, three troops of native cavalry and a company of sepoy marksmen.

The first line was ordered to form to the right of the avenue. This was done on the supposition that, as the enemy were in front, it would be necessary to attack in that direction. On account of the jungle and ravines, however, line could not be formed at right angles to the avenue as had been intended. The leading brigade was, therefore, formed up somewhat obliquely to the right. Scarcely had it taken up this position than eight or nine guns opened on it from a distant tope, and taking the brigade nearly in flank caused some casualties. This necessitated its changing its position still more to the right, and it was formed up behind some jungle. Before this movement had been completed the British iron 18-pounders and the guns of the 2nd brigade had come into action, and checked the fire of the enemy. Coote finding the jungle not impenetrable, ordered the leading corps to push through. With some little difficulty this was accomplished, and other regiments following the line drew up on a fine plain between the jungle and the tope in which the enemy's guns were posted. As soon as the enemy perceived the line drawn up on the plain they drew off their guns and retired to a distance of a mile and a half.

In the meanwhile the second line under Brigadier-General Stuart had advanced up the avenue, and reached a spot immediately opposite the post in the tope on the left. Stuart was directed to support it with a brigade and to detach two battalions to reinforce the baggage guard, which was threatened by the enemy's horse. The leading brigade of the second line, commanded by Lieutenant-Colonel Owen, was ordered to the tope. It now consisted of only two weak battalions, together numbering not more than 800 men. These battalions were the 14th Carnatic (now the 14th M. N. I.) and the 7th and 8th Circar; these two latter were so weak that they had been placed on the roster as a single battalion. The stronger battalions of this brigade had been detached, the 24th Bengal regiment being on baggage guard and the second Carnatic battalion in garrison at Tripassore. The post at the tope was much galled by a heavy fire from the enemy's guns. The 8th Carnatic battalion and part of a Bengal regiment which had first occupied it held the front, and the ravines and hollow ground near it afforded them tolerable cover. On arriving at the tope Owen ordered the 14th battalion with its two 6-pounders and a howitzer to extend to the right, where cover was to be found for the men. The Circar battalion was directed to drive some of the enemy's Poligars out of a ruined village, from whence they galled by their fire the troops in the tope. The battalion advanced in disorder, and in spite of the exertions of its officers retired in such disgraceful confusion that all hope of their again advancing had to be abandoned.* Fortunately just at this moment the 20th Carnatic battalion, which

*The Circar battalions had become inefficient from having for many years been broken up into small detachments employed on civil duties. They, moreover, considered that they had been enlisted for purely local duties, and deemed their march to the South a breach of agreement. The men of the 7th and 8th deserted in such numbers that on their arrival in camp they were placed on the roster as a single battalion—see pp. 18, 35 and 36, Vol. II of Wilson's History of the Madras Army.

had been ordered by General Stuart to reinforce the troops in the tope, arrived upon the scene. The battalion was at once directed to move against the Poligars; it advanced with great steadiness, and drove the enemy out of the village.

It now became apparent from the disposition of the enemy's troops that the post at the tope was about to become the object of a general attack. Stuart was, therefore, directed to proceed to the tope with the only battalion of the second line which had not been detached. Almost immediately on his arrival he was struck by a round shot, the same shot also disabling Lieutenant-Colonel Brown. Lieutenant-Colonel Pearse was about this time detached from the first line to strengthen the troops on the left. Moving by the broken ground in rear of the tope he took up a strong position in the ravines to its left. The enemy's cavalry every now and then made their appearance on his left flank, compelling him occasionally to wheel back the 9th Carnatic battalion to prevent a front in that direction. Pearse posted his guns in a carefully-selected position, and Coote in his report of the action wrote strongly as to the efficiency of their fire, throughout the remainder of the day their shot frequently falling among the flag elephants, whose standards were seen over the rising ground where Hyder himself was posted.

The remainder of the first line followed Pearse's brigade to the left, and as soon as all the corps had formed up a hot fire was opened from all the British guns. The enemy divining that this was the prelude to a general assault limbered up their guns and drew them off. Coote, perceiving that the village of Pollilore covered Hyder's left flank, determined to gain this position, from whence he would be able to enfilade his whole line. Edmonstone's brigade with the infantry of the General's personal guard was accordingly ordered to take possession of the village. This was soon accomplished, and the guns of the brigade, having been placed on a suitable spot, enfiladed Hyder's regular infantry, causing them heavy loss.

At 3 o'clock in the afternoon Pearse had been reinforced by the 4th Carnatic battalion. At 5 o'clock Pearse with his brigade joined Lieutenant-Colonel Owen in front of the tope, where the 8th, 15th and 20th Carnatic battalions had been got ready for an advance, leaving the 14th Carnatic and the Circar battalions with their guns at the tope. These two brigades now advanced as rapidly as the nature of the ground would admit. Crawford and Edmonstone were ordered to co-operate with their brigades. Pearse and Owen advanced steadily against the centre of the enemy, where a number of guns were posted, but on seeing the advance of the British the guns were limbered up, and the whole of Hyder's army went off in great confusion, retiring that night to a considerable distance beyond Conjeeveram, and the next day taking the route to Arcot, leaving a flying camp of cavalry to watch the motions of the British.

The corps on the British left advanced beyond the ground on which Hyder had drawn up his forces, and there lay on their arms for the night. The next day Pearse's brigade advanced towards Conjeeveram, and the enemy's camp of cavalry broke up and joined their main army.

The fatigues the army had undergone the previous day rendered rest necessary. The troops, moreover, were employed in attending to the wounded, burying the dead, collecting shot, and lastly in decently interring the remains of Baillie's detachment.

The loss of the enemy in this action was estimated at close upon 2,000, whilst that of the British was: Europeans killed 28, wounded 25; Natives killed 105, wounded 207, and missing 58. Amongst the wounded were Brigadier-General Stuart and Lieutenant-Colonel Brown; they were hit by the same shot, and each had to have a leg amputated.

This victory in no way improved the aspect of British affairs, for on the 29th Coote was compelled to return to Tripassore, not having a single day's provision left for the fighting men, and the followers not having had any rice for two days.

Shortly after the action Sir Hector Munro quitted the army, and went to Madras for the purpose of embarking for England.*

The disputes between the captains and field officers of the Bengal regiments continued, and led to several duels, Major Kilpatrick, commandant of the 24th Bengal infantry, having been killed in a duel by Captain Scott. The survivor was tried by court-martial. The following is the finding of the court, which is dated 21st September, 1781:—

"The court having well considered the evidence for and against the prisoner Captain Richard Scott, together with what he has urged in his defence, are of opinion that the charge exhibited against him, *viz.*, of his having been accessory to the death of Major Samuel Kilpatrick, has been fully proved, but, as through the whole course of the proceedings many circumstances occur very favorable and alleviating, they do, therefore, acquit him of any degree of criminality, and he is hereby acquitted accordingly.

(Signed) GEORGE MACKENZIE,
Major, 73rd Regiment, and President."

To the north-west of the road leading to Arcot is a country occupied by certain Poligar chiefs, the principal of whom were Vencataputtyraze, Bomraze and the Calastry raja. The retainers of the former had joined Coote, and formed part of his baggage guard at the battle of Pollilore. The two latter were with Hyder, as they said by compulsion, and that they only waited for a favorable opportunity to change sides, and represented that, if the British army would march into their country, it would obtain supplies in abundance. Coote, who shortly after the action of Pollilore had gone to Madras to represent to Government the state of the army, was induced by Lord Macartney†

* He was, however, prevailed upon by Lord Macartney to take command of an expedition against the Dutch Settlement of Negapatam. He left Madras in the fleet under Admiral Hughes, and arrived off Nagore on the 20th October. He landed next day, and joined the army with 300 marines and 600 seamen. On the 29th he carried the redoubts in front of Negapatam, and on the 11th the place capitulated. Some little time after this he embarked for England.

† Lord Macartney assumed the Government of Madras on the 22nd June, 1781, and brought intelligence that Holland had joined in the war against Great Britain.

to agree to move the army into the territories of these Poligars, relying upon their promises to furnish supplies. Accordingly, having rejoined the army, Coote on the 21st September marched to Tritany, and a day or two after captured the petty fort of Paloor in that neighbourhood. With the aid of a small stock of grain found in that place, but more particularly from the success which attended the search for subterranean supplies of food, he was able to subsist his force from day to day, constantly receiving promises of help from the Poligar chiefs, none of which, however, were fulfilled.

Whilst at Paloor, Coote received from Lieutenant-Colonel Lang, commanding at Vellore, an account of the reduced state of his provisions, and a representation that, if not speedily relieved, he would be compelled to surrender. Hyder was, moreover, reported to be distant only ten or twelve miles, near to the hill of Sholinghur, and to be strengthening a position to bar the road to Vellore. Calculating that he had exactly a sufficient quantity of supplies to carry him back to Tripassore, Coote decided to fight another action. He wrote to the Government explaining his situation and urging that at least one day's supply of rice should be sent to Tripassore to provide alike for the contingency of the enemy declining to fight, or of the result of the action not being so decisive as to afford hope of his being able to relieve Vellore.

Leaving some of his heavy guns, together with the greater part of his baggage, in the fort of Paloor, Coote, on the evening of the 26th September, marched seven miles in the direction of Sholinghur. Heavy rain fell that night, and prevented the army resuming its march in the morning. Hyder apprised of the march of the British, and also of the cause of their halt, gave out that his army would not move that day. In consequence of this order all his cattle were sent some distance to graze, and many of his troops dispersed to seek for grain in the adjacent villages, the want of cavalry in the British army leaving them free to wander without fear of danger.

Taking a detachment of cavalry Coote went out to reconnoitre, and ascending a height observed a long ridge of rocks occupied by the enemy. He ordered the second brigade out from camp, and having dislodged the Mysoreans drew up the brigade with this strong pass in its rear. From this ridge Hyder's whole army was visible, distant about three miles. Coote now sent orders for the rest of his army to join him with all practicable expedition. His orders were promptly obeyed. The baggage, escorted by two battalions with four 6-pounders, was placed in a position where it remained secure throughout the operations of the day.

According to the usual practice the army was told off into two lines, but marched in one column. After passing round the left of the ridge of rocks it moved in a direction parallel to the line of the enemy's encampment until the centre of the first line, when fronted, should be opposite the main body of the enemy, distant about two miles, and drawn up in front of their camp, then in the act of being struck. The second brigade under Major Edmonstone was on the right of the first

line, and was directed to halt when it reached a hill, upon which, when fronted, its right would rest. There was a smaller hill to the left, on which the left of the line rested, and the rear was secured by the ridge of rocks. Coote's object was to induce the enemy to change front, hoping to take advantage of the confusion which would be sure to occur in its unwieldy masses whilst carrying out the movement.

The second brigade, however, advanced further than Coote had intended ; this separated it from the first or European brigade. The enemy's guns now opened a distant cannonade, and Coote, deeming it more advisable that the troops should endure this fire when in motion than when halted, ordered the whole line to advance, the second brigade being directed to incline to its left to regain touch of the first brigade. As the line advanced it was necessary for some parts of it to defile to pass a group of rocks. At this moment two large bodies of horse charged with great determination. One body charged the 13th Bengal regiment and the 17th Carnatic battalion of Major Byrne's brigade ; they came on resolutely, but suffered severely from grape and round shot from the guns near those regiments. The two battalions behaved with great steadiness, reserving their fire until the horses were close up to their bayonets, when pouring in a volley their assailants drew off with heavy loss. At the same instant Hyder's select corps of stable horse charged the 18th and 21st Carnatic battalions of Lieutenant-Colonel Owen's brigade. Owing to the nature of the ground there was a considerable interval between these two battalions ; they received the cavalry steadily, and repulsed a front attack. The horsemen then made for their exposed flanks ; this brought them under a heavy cross fire from the battalions next to the 18th and 21st, and so galled were they that they galloped through the intervals to the rear, sustaining additional loss from the fire of the rear ranks, which were faced about.

The enemy, perceiving that their cavalry had been totally defeated, began to draw off their nearest guns. The first line, under Lieutenant-Colonel Crawford, was ordered to follow them, and the second brigade, bringing up their artillery before the enemy was out of reach, warmly cannonaded their rear corps. Night coming on the pursuit had to be abandoned, the General not deeming it prudent to divide his small force.

Whilst the first line was thus occupied Coote received information from Pearse, who commanded the second, that he was hard pressed, and that some of his field pieces were in want of ammunition. One large body of the enemy was on his left flank and another under Tippoo with twelve guns in his rear ; the latter force, it was evident, was intended to attack the baggage. Pearse was ordered to change front partially to his left, at the same time keeping up communication with his baggage ; this movement was performed with celerity and precision. The enemy attempting a corresponding movement got into confusion, and suffered severely from the British guns. They now drew off, and Tippoo at the same time abandoned the idea of attacking the baggage. At about 8 o'clock the baggage was ordered to join Pearse and, this effected, that

he should join the first line. The junction was completed by midnight, and the army encamped in the high ground the enemy had occupied.

The acquisitions of the day were three cavalry standards and one gun, but Coote stated, in a note written from the field of battle, he would willingly have exchanged these trophies together with the credit of the victory for five days' rice. The loss of the British in this action only amounted to 100 killed and wounded. "The Mysoreans," says Wilks, "uniformly describe the battle of Sholinghur as a surprise, and admit it to have been a severe defeat, in which their loss probably exceeded 5,000 men."

The day after the action Coote received information that the Poligar chiefs, Bomraze and the Calastry raja, had left Hyder. He, therefore, on the 28th, marched through the Sholinghur pass, and encamped near Bomraze's country, hoping to be able to draw supplies from thence. By this movement also he approached nearer to Vellore. Hyder, furious at the defection of the Poligars, despatched a picked body of 6,000 men without guns to ravage their country, a proceeding which would effectually have prevented the British from obtaining the supplies of which they were in need. Coote, although suffering from severe illness, determined on immediate action, leaving his camp on the 14th October with three battalions of sepoys under Major Edmonstone and all his cavalry. "After an absence of thirty-eight hours, during thirty-two of which he had never dismounted from his horse, he returned to camp, having completely surprised, discomfited and dispersed the enemy, and compelled them to leave behind, not only the whole of their plunder, but the few tents and light equipments with which they had entered the woods."

The urgent necessity for relieving Vellore induced the British commander to detach a force under Lieutenant-Colonel Owen,* twenty miles in advance of the main army. It consisted of a detachment of cavalry under Captain Macalister, a detachment of artillery under Captain Moorhouse, the Grenadier company of the Bengal European regiment under Captain Moore, the 24th Bengal Sepoys, the 4th, 8th, 14th and 21st battalions of Madras Sepoys and a detachment of Pioneers. The objects with which this force was detached were to command the resources of a larger extent of country, to support the friendly Poligars, and, if possible, to cut off some of the convoys for Hyder's army.

* The appointment of this officer to command a brigade was the cause of much discontent amongst the officers of the Company's service. Lieutenant-Colonel Owen's history was as follows: "When Sir Eyre Coote was appointed to succeed General Clavering as Commander-in-Chief he obtained permission to take out to India as one of his aides-de-camp a Mr. Arthur Owen. In the letter from the Court of Directors to the Government of Madras announcing this appointment it was stated that "they had granted Mr. Owen the rank of lieutenant-colonel by brevet in our forces during the continuance of the General in India, and although we do not intend that he should be appointed to any corps in the Company's troops, or supersede any of the officers of the rank of lieutenant-colonel by having the above mentioned brevet, nevertheless we desire that he do enjoy the usual pay and allowances of a lieutenant-colonel on the Bengal establishment during the time Sir Eyre Coote shall continue in command of our troops." Lieutenant-Colonel Owen accompanied Sir Eyre Coote from England to Bengal, and went with him from Bengal to Madras in November, 1780. In August, 1781, when the Bengal troops arrived, he was placed in command of a brigade, notwithstanding the orders of the Court of Directors to the contrary.

On the 22nd October the detachment was encamped in advance of a strong pass, situated between it and the main army. At daylight the following morning it was suddenly attacked by Hyder in person at the head of nearly all his regular infantry and light guns and all his select cavalry, and vigorous efforts were made for its destruction before it could either gain the pass or be succoured by the main army. Owen at once, perceiving the desperate position in which he was placed, set fire to his tents, and abandoning his baggage marched rapidly towards the pass. Just as the head of the column entered the pass the 8th Carnatic battalion, which formed the rear guard, was charged by a large body of horse and broken; its commander, Captain Walker, was killed, and one of its field pieces fell into the hands of the enemy. Captain Moore, perceiving this disaster, promptly turned, and with the Bengal Grenadiers, supported by the 20th Carnatic battalion, forced his way with the bayonet through the masses which were carrying off the gun, and brought it back in triumph. The 8th battalion rallied, and the force effected its retreat, and joined the main army without further molestation. Its casualties amounted to 317 killed and wounded, whilst those of the Mysoreans were computed by themselves to have exceeded three thousand. Captain Moorhouse essentially contributed to the safety of the detachment by the judgment with which he selected successive positions for his guns to cover its retreat. The conduct of Lieutenant-Colonel Owen, of Captain Campbell, commanding 14th battalion Madras Sepoys, and of Captains Moore and Moorhouse, was highly praised by Coote. The Bengal Grenadiers were specially mentioned in his order: "The brave and reasonable exertion of the company of Bengal Grenadiers under Captain Moore is worthy of the highest applause, and should ever be held in remembrance as a proof of the merit of that company and honorable to the corps they belong to." He concluded the report of this affair, which he sent to Government, by declaring that never, since he had been a soldier, which was then forty years, had he seen such distress in any army as then prevailed in his.

After the capture of Arcot on the 3rd November, 1780,* Hyder had allotted a large portion of his army and his best battering train for the siege of Vellore. The garrison was commanded by Colonel Ross Lang, and consisted of the head-quarters 1st battalion Madras European regiment, five and a half companies 5th battalion Madras Sepoys, and a detachment of artillery. For some time the garrison had been in the greatest distress. A little money had been received from Madras, brought by sepoys who had succeeded in making good their way in disguise. Grain had been bought in distant villages, and brought in by stealth on dark nights. Now, however, not a day's supply of grain was in store. The approaching moonlight nights and the expected

* The capitulation was signed by Captain Dupont, the Commandant, Captain Prendergast having been severely wounded. The garrison consisted of 157 of the 1st Madras European regiment, the same number of sepoys and a party of the Nawab's troops. They were permitted to depart on the condition that the Europeans should not serve again during the war.

rising of the river would decide the fate of the garrison, and Lang represented to Coote the alternative of throwing in supplies, or making a movement to cover the escape of the garrison. The exertions of the army had succeeded in collecting a small surplus stock of grain, and Coote, on the 1st November, set out for Vellore, and on the 3rd made over to the garrison a supply sufficient to last for six weeks. After the relief of Vellore Coote returned to the Pollams, taking with him Colonel Lang and the Grenadier company of the Madras European battalion.

Having been led by false information to believe that the fort of Chittoor was an intermediate depôt of provisions for Hyder, Coote appeared before the place on the 7th; it fell after a siege of four days. No grain, however, was found in the fort.* Leaving Captain Lamotte with the 9th battalion of Madras Sepoys to garrison the place, Coote returned to the Pollams. Shortly after this news reached him that Tippoo had laid siege to Tripassore, and the army at once marched for the relief of that post. The monsoon had set in, and the roads had become almost impassable. Not only did the cattle die in numbers, but many of the camp followers perished from the effects of the weather and starvation, for the scarcity of food was such that even the fighting men only received rations every other day. Tippoo abandoned the siege on hearing of Coote's approach. "In this dreadful march," wrote Colonel Pearse, "we lost 104 horses of the cavalry, about 1,000 bullocks, one elephant, some camels, and a number of men." Writing on the 27th November, Colonel Pearse says: "We are now destroying the place, and are in hopes of shortly receiving orders to go into cantonments, as we are without tents to cover us and with hardly any food to save our people from starving, for now there are not even supplies to be bought for money. All officers are five months in arrears; the men were paid up to the end of August a few days ago."

Before the end of December the enemy laid siege to Chittoor, and the fort being considered untenable, Captain Lamotte capitulated, the Mysoreans agreeing that the garrison should be allowed to go to Madras with their private property. These terms were violated, and the officers were sent to Seringapatam and the men to Bednore where many of them were found when that place was taken by the Bombay troops in 1783. This success of the enemy concluded the campaign of 1781, for destitute of provisions and crippled for want of transport the army had returned to Madras shortly after the relief of Tripassore, and went into cantonments at Poonamallee.

The dissensions among the officers of Pearse's detachment, consequent upon the want of orders defining the relative duties of majors

* "No character of the war was more conspicuous than the almost invariable defects of Sir Eyre Coote's intelligence, with the exception of that received through Lieutenant Flint, or by means of sepoys disguised for specific purposes. This defect is frequently stated in his official correspondence, but he does not appear to have suspected that all his guides and spies were in the service of the enemy.' Wilks, Vol. I, p. 497.

and captains under the new organisation, have already been related. There were, however, other causes at work which caused discontent in Coote's army. Pearse had a grievance of his own, for, when he had been appointed to the command of the troops to be sent from Bengal, he had been told that after his arrival on the coast the Bengal troops were to remain a separate division under his command. Within a week, however, of his having joined the main army the detachment was broken up and the regiments brigaded with those of the coast establishment. Pearse remonstrated, but without effect, and the Government of Madras, following up Coote's order, passed a resolution on the 1st November, 1781, by which the allowances for the separate command were taken away.*

The plan of brigading the Bengal and Madras Sepoys together did not answer. Pearse in a letter to Hastings wrote: "This dividing our sepoys has done much injury to the service; the vague assertion that they are all servants of one master is of no avail." Constant quarrels between the men of the two establishments took place. The Bengal Sepoys, all, needless to remark, up-countrymen, resented being called Bengalis by the Madras sepoys. So frequent and serious were the quarrels on this account that Coote on the 22nd September published the following order:—

"The General is much concerned to have so many reports daily of disputes between the Bengal and Coast sepoys.

"The appellation 'Bengalee,' made use of by the Coast sepoys, should be particularly explained to their men by the officers commanding the Bengal native corps as the general designation by which the sepoys of this country know those of the other establishment, and without attaching to it the same meaning as it has in Bengal.

"The General expects he will not again have occasion to address the commanding officers of the native corps on this subject, and that they will, by every possible means, promote the concord and unanimity which ought ever to subsist amongst soldiers who are to consider themselves as brothers fighting in the same cause, and to draw their swords only against the common enemy."

The new organisation of the Bengal army had largely increased the number of field officers on that establishment. No similar increase had been made in the Coast army, and the result was that many captains on the latter establishment had been superseded by Bengal officers, who had been their juniors in the rank of captain. A strong remonstrance was addressed to Coote by the superseded officers. The General admitted the justice of their complaints, but declined to interfere, chiefly on the ground that a number of officers of the King's service had been superseded and that a compliance with their request would increase the evil. He, however, wrote to the Bengal Government a strongly-worded protest against the new organisation, which had been brought into effect

* His monthly pay and allowances were as follows: Pay for a month of thirty days, Rs. 300; allowance for table, Rs. 4,000; batta for thirty days, Rs. 1,500; contingencies, Rs. 1,500; off reckonings, Rs. 150. Total, Rs. 7,450.

immediately after his having quitted Bengal and without his having been asked for his opinion on the measure.

For some little time before the conclusion of the last campaign Coote had been confined to his bed by severe sickness, and had at last been compelled to request that he might be relieved from the command of the army. Of the senior officers at Madras at this time Stuart, who had lost a leg at Pollilore, was incapacitated for duty, and Crawford had decided to return to England; the next senior officer was Colonel Ross Lang, who was, therefore, nominated to the command, with Pearse as his second in command.

Vellore had been provisioned by Coote up to the 15th December, and by various means Captain Cuppaye, the commandant, had succeeded in obtaining a small additional supply. This supply was now exhausted, and the relief of the place became a matter of paramount importance. The state of affairs is thus described by Pearse in a letter written on the 17th December, 1781: "I do not see how we are to effect the relief of Vellore if Hyder does his duty, as he is between us and the place with all his force; and, knowing our project, he certainly will be under no anxiety in providing for the defence of Arcot, and therefore may bring his whole force against us. We must go off without necessaries, tents, &c.; we take only light guns, and our distressed state he knows as well as we do."

"Coote is too ill to go. Colonel Lang must command; he nobly defended Vellore: not that it was attacked in form, but for a year he found ways and means to maintain his garrison and his detachment in a fort which was enclosed in another, on a hill close to Vellore and commanding it, and he repulsed Hyder in three attacks."

"If Lang commands I must be second in command. I heartily wish, however, as the case is critical, that Coote was going with us, because I believe the sepoys have an opinion of him; but if we get well through the business so much the better, as it will show them we can do without him."

To enable the army to march, and carry a sufficiency of supplies for the beleaguered garrison, it was estimated that 30,000 bullocks would be required, less than 10,000, however, were forthcoming. On the orders for the march being promulgated a fresh and serious difficulty arose. The sepoys, who were without necessaries, and had received no pay since the 1st September, refused to march. In this emergency Coote determined, at whatever risk to himself, to resume command of the army. A sum of money sufficient to pay the sepoys up to the 1st November was raised, and the discontent in a great measure subsided.

Information was just at this time received that three regiments of the King's service had sailed for India, and that on their arrival the senior officers were to have brevet rank given to them, which would make them senior to officers of the Company's service. Lang, seeing that there was every prospect of his being superseded, applied to Coote to be made a Brigadier-General. Coote refused to comply with his request, and Lang on the same day sent in his resignation of the service.

On the 4th January, 1782, the army was encamped near Tripassore, and was to commence its march for Vellore on the following morning,

At daybreak Coote's valet, on entering his master's tent to awake him, found him senseless ; medical aid was instantly called. He was found to be in an apoplectic fit, and for two hours there was but little hope of his recovery. Expresses were immediately sent to Madras, and Lord Macartney induced Lang to withdraw his resignation and to take command of the army. Coote, however, recovered, and the next morning, carried in a palanquin, set out for Vellore.

Coote reached Vellore on the 11th January, and made over to the garrison provisions sufficient to last for three months. Hyder had not ventured to seriously attack the army on its march, but contented himself with a distant cannonade. On the 13th the army commenced its return towards Madras. Hyder made an attempt to dispute its passage across a morass, but, owing to Coote's skilful dispositions, the crossing was effected with but trifling loss. On the 16th Hyder appeared in full force with the apparent intention of offering battle. Coote decided to accept the challenge, but after manœuvring for ten hours, having failed to bring on an engagement, he resumed his march, and the army reached Tripassore without further incident.

Hyder had been foiled in all his efforts to annihilate the British army. The Nairs had risen in insurrection against him throughout the whole province of Malabar. He had been disappointed in not receiving any aid from the French, and was threatened with an invasion of Mahrattas from the north. He began to despond, and determined to abandon all idea of conquering the Carnatic. In pursuance of this policy he ordered all the places he had taken to be evacuated and destroyed, and the inhabitants to migrate to Mysore with their flocks and herds. His plans, however, were suddenly changed by the arrival at Porto Novo, on the 10th March, 1782, of the long expected troops from France.

The French and the British Governments had both determined to make vigorous exertions to obtain pre-eminence on the coast of Coromandel. The French entrusted the conduct of their affairs in the East to the Marquis de Bussy,* a veteran, who thirty years before had distinguished himself at the head of a body of French troops in the Deccan. The first detachment of troops for India sailed from Brest early in December, 1781, but on the 13th of the month the transports on which they were embarked were captured by Admiral Kempenfeldt,† and in April, 1782, those

* When Coote defeated the Count de Lally at Wandiwash on the 22nd January, 1760, Bussy and twelve other French officers surrendered themselves prisoners to the British. Coote released Bussy on his parole. The Government, however, disapproved of the measure, and directed that he should be recalled and sent to Madras. The reason for this was that it had been ascertained that Lally had ordered nearly twenty officers then on parole to serve during the action. In March Bussy gave himself up to Coote, and offered to pay his ransom. Coote declined to accept it, and Bussy remained a prisoner for some time.

† On the 29th August, 1782, the "Royal George," of 100 guns, Kempenfeldt's flag-ship, when at anchor at Spithead, was caught by a sudden squall, upset, and went to the bottom with the Admiral, his crew and a number of women and children who happened to be on board. It was estimated that one thousand persons perished on this occasion. Kempenfeldt was nearly seventy years of age, and was considered one of the best officers in the service. He was the son of a Swede, who entered the British navy under James II. He followed his master into exile, but was recalled by Queen Anne.

with the second detachment were captured by Admiral Barrington. Bussy himself reached the Isle of France in June, 1782, and found that the Governor had in the previous December despatched a detachment of troops to India on board the fleet commanded by Admiral d'Orves. The Admiral died on the voyage, and the command devolved on Admiral de Suffrein. During the passage the British frigate *Hannibal* was captured, besides several merchantmen.

The French Admiral had under his command ten sail of the line, a 50-gun ship, and several frigates. He was aware that Admiral Hughes was in Madras roads, but had been led to believe that he had only four sail of the line with him. Under this impression Suffrein made for Madras, and arrived in the roads on the morning of the 15th February, 1782, hoping by one decisive blow to destroy the British squadron, and thus be in a condition to at once invest Fort St. George, both by sea and land. Hughes, however, had arrived at Madras with six sail of the line, and had subsequently been joined by six more. In anticipation, moreover, of the arrival of the French fleet a detachment of the newly-arrived 98th regiment had been distributed amongst the British ships to serve as marines.

On seeing that there were more British ships than he had anticipated, the French Admiral anchored at about noon, but at 4 o'clock the same afternoon he weighed anchor, and stood away to the southward. Hughes promptly sailed in pursuit, and during the night succeeded in re-capturing five of the British merchantmen and the *Lawriston*, a large ship, having on board a number of French officers and 300 men of the regiment de Lausanne. At daylight Suffrein, perceiving the danger to which his convoy was exposed, put his ships before the wind and bore down upon the British, and an indecisive fight ensued, which lasted till dark, when the French Admiral sailed for Porto Novo, where he landed 2,000 soldiers, including a regiment of Africans, and then sailed for Point de Galle. The British fleet at the same time sailed for Trincomalee * to refit, and this having been accomplished returned to Madras early in March.

Immediately Hyder heard of the landing of the French troops at Porto Novo he directed Tippoo, who was in command of a corps in the southern countries, to proceed thither and confer with the French commander. Shortly afterwards Hyder himself had an interview with Suffrein and de Cossigny, and was assured that the Marquis de Bussy would soon arrive with large reinforcements. It was agreed that Cuddalore should be at once reduced and prepared as a depôt. The French accordingly marched to that place, and summoned it to surrender. The garrison was totally inadequate for the defence of its extensive works, and, favorable terms having been offered, the fort was surrendered on the 8th April without a shot having been fired in its defence.

On the 30th March Admiral Hughes sailed from Madras for Trincomalee with a reinforcement of troops and stores. On the 8th April the French fleet appeared in sight, and on the 11th a stubborn and indecisive action was fought. The loss of the British was 137 killed

* Captured from the Dutch by the fleet and a detachment of Madras troops on the 5th January 1782.

and 430 wounded, while the French owned to having had 139 killed and 364 wounded. After the engagement the latter made for Batticola, a Dutch port, and remained there until early in June, when they returned to the coast of Coromandel.

Although the reinforcements of British troops sent to India did not meet with misfortunes similar to those which befell the reinforcements despatched from France, still a variety of causes combined to prevent their rendering the aid to British interests on the coast that might have been reasonably expected. Early in 1781 a large fleet was assembled at Spithead, under Admiral Darby, for the relief of Gibraltar. Attached to it was a squadron, the destination of which was kept secret. It consisted of the *Hero* 74, *Monmouth* 64, *Romney*, *Jupiter* and *Isis* of 50 guns each, three frigates, a bomb vessel, a fire-ship and the *Kite* cutter. There were in addition several Indiamen and transports, on board of which were 3,000 troops under command of General Medows. This force consisted of the second battalion 42nd, or Royal Highland regiment,* Lieutenant-Colonel Macleod ; the 78th, or Seaforth Highlanders,† Lieutenant-Colonel the Earl of Seaforth ; the 98th regiment,‡ Lieutenant-Colonel Fullarton ; and the 100th regiment,§ Lieutenant-Colonel Humberstone. On the 15th March, 1781, the fleet put to sea, and after crossing the Bay of Biscay the secret service squadron, under command of Commodore Johnstone, parted company, and steered for the Cape of Good Hope.

Both the French and the Dutch obtained information of the fitting out of this squadron, and the latter power, fearing that it was intended to attack one of her colonies, besought the aid of the French. The appeal was successful, and a squadron of five ships of the line, some frigates, together with a body of troops, was hastily got together, and under command of Admiral de Suffrein‖ was despatched to watch Commodore Johnstone's movements. The latter, however, after a quick passage, arrived unmolested at Porto Praya roads in the Cape de Verd Islands. The French admiral, having satisfied himself as to the destination of the British, also made for Porto Praya,

* Raised about the year 1780, formed into a separate corps, and designated 73rd Highlanders in April, 1786. It is now known as the 2nd battalion Black Watch (Royal Highlanders).

† Embodied in May, 1778. Number changed to 72nd in 1786 ; is now the 1st battalion Seaforth Highlanders (Ross-shire Buffs, the Duke of Albany's).

‡ Raised 1780, disbanded 1785.

§ Raised 1780, disbanded 1785. This regiment is said to have lost 39 officers and 1,200 men killed in action and died of disease during the time it was in India.

‖ Pierre de Suffrein was a native of Provence. He was born in 1726, and at the age of 17 entered the navy. He joined the *Solide*, and was on board that vessel when it engaged the British ship *Northumberland*. In the action with Admiral Hawke in 1747 the ship on which he was then serving struck her flag, and Suffrein was sent a prisoner to England, but was released at the Peace of Aix-la-Chapelle in the following year In the interval before the next war he employed himself in passing his terms for the Order of St. John of Jerusalem, of which he became a knight. On the renewal of the war he joined *L'Orphée*, forming part of the fleet sent to assist at the siege of Port Mahon. From *L'Orphée* he was transferred to *L'Océan*, and was taken prisoner in this ship, and again sent to England. He was released at the conclusion of the Seven Years' War in 1763.

where Johnstone, unconscious that he was being pursued, and perhaps trusting to the fact that he was in a neutral port, permitted his ships to anchor in an irregular manner, and took no precautions against a surprise. On the morning of the 16th April the outermost British ship descried a strange squadron approaching, and soon after it was made out to consist of French men-of-war, and signals were made to recall all men on shore. Suffrein, pushing on with his three largest vessels, firing from both sides as he advanced, was soon in the midst of the British ships. The latter, owing to their position, were only able to bring half their guns to bear on their opponents. After a short period, however, the Indiamen were able to join in the conflict, and the French got so roughly handled that they were glad to make their way out of the harbour.

After having repaired damages Commodore Johnstone in the beginning of May sailed from Porto Praya, and in the middle of June despatched Captain Pigott with three of his fastest ships to obtain information of Suffrein. Whilst on this service Pigott captured a large Dutch East Indiaman laden with stores and having £40,000 in bullion on board for Ceylon. From his prisoners Pigott learnt that Suffrein was in False Bay on the 21st June, and that several Dutch Indiamen were in Saldanha Bay, and therefore out of reach of the protection of the French squadron. Commodore Johnstone in his sealed instructions had been directed to effect the conquest of the Dutch settlement at the Cape of Good Hope, but, considering that the presence of the armament under Suffrein would prevent his effecting this object, he determined to attack the Dutch ships in Saldanha Bay. This scheme he carried out on the 22nd July, and resulted in the capture of three large ships and the burning of a fourth. After this success he sent the *Hero*, *Monmouth*, *Iris* and *Active* with General Medows and the troops to India, and returned with his prizes to England. Some little time after the departure of Johnstone for England Suffrein sailed for the Isle of France, where he arrived on the 25th October, 1781, and from whence, as we have seen, sailed in December for the coast with the fleet under Admiral d'Orves.

Of the men-of-war and troops sent on to India by Commodore Johnstone the *Monmouth*, *Hero* and *Isis*, with one transport, having on board General Medows, Lieutenant-Colonel Fullarton and four hundred men of the 98th, reached Madras on the 9th February, 1782, and took part in the first action between Admirals Hughes and Suffrein, the men of the 98th being distributed amongst the ships to act as marines. The 78th Seaforth Highlanders did not reach Madras until the 2nd April, 1782. This regiment had embarked 1,100 strong, but lost 230 men from scurvy and other causes on the voyage, and out of the 880 men that landed only 390 were fit for duty. The death of the Earl of Seaforth, who expired before the regiment reached St. Helena, threw a damp over the spirits of the men, and is said to have materially contributed to the prostration of mind which made them more readily the victims of disease. With the exception of the *Myrtle* transport the ships with the 42nd and 100th regiments reached Bombay on the 5th March,

1782. The *Myrtle*, with Lieutenant-Colonel Macleod and three companies of the 42nd on board, got separated from the other ships in a gale, and did not reach Madras until long after all the other vessels.

The British army continued in the neighbourhood of Madras until the 10th April, when it marched to Chingleput, and towards the end of the month was joined by all the men of the 78th Highlanders who were considered fit for service. On the 11th May the united forces of Hyder and the French suddenly appeared before Permacoil, a hill fort distant about twenty miles north-west of Pondicherry. Coote, on hearing of this, instantly marched to its relief, but his movements were delayed by violent storms, and he had the mortification of hearing that it had been forced to capitulate on the 16th, and that the combined forces were marching towards Wandiwash. Coote had ordered this place to be mined, so that it might be at once destroyed should such a measure become necessary. He now decided to march, and, if possible, bring the enemy to action. The allied army had been four days in sight of the place, when on the appearance of the British they withdrew, and Captain Flint, the gallant commander of the garrison, was able to make over to Coote a welcome supply of one thousand head of cattle and four hundred sheep, which with indefatigable exertion he had been able to collect before his post had been invested.

The French had suffered much from sickness, and the force which they could put into the field was still further reduced by the garrisons which it was necessary to maintain at Cuddalore and Permacoil. Bussy, moreover, had issued imperative orders that they should not risk a general action. Under these circumstances the commander of the French troops, avoiding meeting the British in the field, retired to Killanoor, distant 14 miles west of Pondicherry, where he had prepared a strongly-entrenched camp, and which Coote having reconnoitred did not deem it prudent to attack.

On the 30th May Coote marched towards Arni, which place, although it was one of Hyder's principal depôts, had been left with a small garrison. Hyder, divining Coote's intention, on the same evening despatched Tippoo with orders to proceed by forced marches and throw a strong reinforcement into Arni, and he himself determined to follow the next day. His allies when appealed to for aid replied that their instructions would not admit of their accompanying him, and Hyder in retaliation directed that the daily supplies which had hitherto been furnished to the French should be discontinued during his absence. On the morning of the 2nd June Hyder came in sight of the British army. Just as it was preparing to encamp Coote, eager to bring on a general action, by a succession of skilfully-conceived manœuvres, succeeded in closing with his opponents. Hyder, following his constant practice of not risking his guns, immediately ordered them to retire, but the Grenadiers of the 73rd regiment and of the Madras European battalion, supported by a battalion of Bengal Sepoys, by a spirited charge succeeded in capturing one gun and eleven tumbrils. Want of cavalry prevented Coote from following the enemy

and capturing more of his guns. As Tippoo had succeeded in strongly reinforcing Arni, the General was compelled to abandon all thought of capturing that place. The loss of Europeans and natives on this day amounted, including the wounded, to seventy-four, and in this number were seventeen, chiefly men of the 78th, who died from fatigue.

Hyder, anxious to obtain some advantage over the British, devised, on the 8th June, a stratagem, which effectually succeeded. Some elephants and camels, apparently carelessly guarded, were made to pass within a short distance of the grand guard. The body of men so called acted as a personal guard to the General, and consisted of a detachment of cavalry, two light guns and 100 sepoys, and was commanded by Lieutenant Cruitzer. Seeing the elephants and camels Cruitzer determined to seize them, and sent a message to the field officer of the day, Lieutenant-Colonel James Stuart,* 78th Highlanders, to tell him of his intention. Stuart instantly mounted his horse, and rode at speed to stop Cruitzer from leaving camp. He, however, was too late, and arrived just in time to see the guard charged on all sides by crowds of cavalry. Perceiving that all was lost Stuart looked to his own safety, and escaped with difficulty, his horse leaping a ravine over which none of the enemy could follow him. The loss of the British in this unfortunate affair was 166 men, 54 horses and two guns. Elated with his success Hyder on his return to camp fired a salute in honor of his victory.

Climate and fatigue having greatly increased the number of Europeans on the sick list, Coote marched to Wandiwash, and after a halt there of four days returned to the neighbourhood of Madras on the 19th June.

The French admiral, aware that the British expected a strong re-inforcement of troops, which were being brought from England under convoy of a fleet commanded by Sir Richard Bickerton, determined to attempt the capture of Negapatam before the expected reinforcements could arrive. Admiral Hughes hearing of his intention at once sailed for that place. At noon on the 6th July Suffrein appeared before Negapatam. By 3 o'clock the British fleet had weighed anchor and put out to sea, and the next morning engaged their antagonists. The number of ships in each fleet was equal, but the British had 732 guns to 707 of the French. The fight was maintained with great

* He succeeded the Earl of Seaforth in command of the 78th. He served for many years in India with great distinction. In 1796 he was appointed commander-in-chief at Bombay, and commanded the division of the Bombay army at the capture of Seringapatam in 1799. In 1800 he went to England, but returned to Madras in the following year, having been appointed commander-in-chief of the army of that Presidency. He took the field against the Mahrattas in 1803. In 1805 he returned to England, and died in 1815. The fact of their having been two General James Stuarts has led to confusion in some of the histories of this period, the acts of the one being described as the acts of the other. When they were both together in India they were distinguished by their compatriots by the names of their paternal estates. Thus the General Stuart who arrested Lord Pigot, and was deputed by Lord Macartney, was known as Stuart of Torrance, while Stuart of the 78th Highlanders was designated as Stuart of Blairhall. Later on the latter obtained the *soubriquet* of Trimul Row (Trimul Rao), which was afterwards changed to Old Row.

resolution, and ended without either side having captured a ship. The loss of the British was 76 killed and 233 wounded, while that of the French was 168 killed and 601 wounded. After the action Hughes returned to Madras to refit, and Suffrein repaired to Cuddalore for the same purpose.

Whilst at Cuddalore Suffrein heard that two ships of the line, having under convoy a division of the Marquis de Bussy's troops, had arrived at Point de Galle. He accordingly sailed for that place on the 1st August,* and effected a junction with these reinforcements. It was not until the middle of August that Admiral Hughes heard of this junction; he at once made ready for sea, being seriously alarmed for the safety of Trincomalee. No sooner had Suffrein joined the reinforcements than he proceeded to attack Trincomalee. He arrived in back bay on the 26th, at once landed the troops and invested the place. The French batteries opened fire on the morning of the 29th, and before night had silenced those of the garrison The following morning the place was summoned to surrender, and so eager was Suffrein to obtain possession that he granted everything the commandant Captain Hay Macdowall† could desire.

On the 2nd September Admiral Hughes arrived, and had the mortification of seeing the French colors flying from all the forts. The enemy's fleet was now superior to that of the British, and no sooner did the latter appear in sight than Suffrein put to sea to engage them. Hughes might have avoided an action, but so eager were his men for a fight that he hoisted the signal to engage at two cables distance. The action which ensued was the fourth fought by the two fleets in the year, and terminated a naval campaign unequalled by the number and obstinacy of the actions by which it was distinguished. As in the former fights neither side lost a ship. The casualties of the British amounted to 1,350 killed and wounded, whilst those of the French are stated to have been 1,100. The French returned the same night to Trincomalee, and in getting into harbour in the dark lost *L'Orient* 74, one of their best ships. So little satisfied was Suffrein

* Some little time before this period Suffrein had made a proposal to the Madras Government for an exchange of prisoners The proposal was forwarded to Coote, who signified his concurrence, but expressed a desire that the British prisoners in the hands of Hyder, the ally of the French, should be included in the exchange. Suffrein rejected this condition. No further communications appear to have passed on the subject, and just before he sailed from Cuddalore on the 1st August, 1782, in spite of the remonstrances of several French military and civil officers, Suffrein made over to Hyder 50 officers and warrant officers, and close on 400 sailors, whom he had captured in the *Hannibal* frigate and various vessels. These unfortunate men were at once chained together two and two, and marched off to Mysore.

† He succeeded Sir John Craddock as Commander-in-Chief of the Madras army. The former had held a seat in Council with additional allowances, but the Court of Directors refused to appoint General Hay Macdowall to the vacant seat. The General remonstrated; his appeal was rejected, and a civilian appointed a member of Council in his stead. The General considered this a personal affront, and resigned his command, couching his resignation in terms strongly indicative of his mortification and disappointment. Early in 1808 he embarked for England, but the vessel was never heard of again. He was succeeded in the command of the Madras army by Sir Samuel Auchmuty, who was appointed a member of Council.

with the conduct of his officers that he sent six captains to the Mauritius to be tried by court-martial. After the action the British fleet returned to Madras.

As a further reinforcement for the British forces in India a squadron of men-of-war under Sir Richard Bickerton sailed from England on the 6th February, 1782. The ships of war were the *Cumberland* and *Defence* of 74 guns, the *Sceptre*, *Africa* and *Inflexible* of 64 guns, and the *Juno* and *Medea* frigates. They gave convoy to several transports, having on board the 23rd Light Dragoons,* Lieutenant-Colonel Sir John Burgoyne, *Bart.*; the 101st Foot,† Lieutenant-Colonel Adams; detachment 102nd Foot,‡ Lieutenant-Colonel Bruce; the 15th Hanoverians,§ Lieutenant-Colonel Reinbold; 200 recruits for the 73rd and 78th Highlanders and 500 for the Madras European regiment. The *Sceptre* and *Medea*, having got separated from the rest of the ships, steered direct for Madras, capturing on their way a French transport, having on board ninety men of the regiment of Pondicherry and a large quantity of military stores. Leaving the prize in charge of the *Medea*, the *Sceptre* continued her voyage, and reached Madras in the end of July, the *Medea* arriving two or three weeks later.

The declining state of Sir Eyre Coote's health rendering a change of air necessary he made over command of the army to Major-General James Stuart, and on the 28th September sailed in the *Medea* frigate for Bengal.

The British fleet had kept the sea throughout the monsoon of 1781; the ships were much in need of repair, and in the opinion of the Admiral it was absolutely necessary that the fleet should go to Bombay to refit. Lord Macartney, apprehensive lest the French fleet should winter at Trincomalee, and be thus at hand to co-operate with the expected army under Bussy, and also be able to intercept the supplies of grain from Bengal, urged the Admiral to risk the British fleet for the purpose of covering an attempt on Cuddalore, and thus decide the war

* The first British cavalry regiment that ever came to India, raised in 1781, renumbered the 19th in 1783. It served with great distinction in India until October, 1806, when it embarked at Madras for England, where it landed in April, 1807. When first raised its uniform was scarlet, but in 1815 was changed to blue with yellow facings. It was disbanded as the 19th Lancers in 1821.

† Raised in 1780, disbanded in 1784.

‡ Raised in 1780, disbanded in 1784.

§ Two regiments of Hanoverians were raised in 1781 for service in India. They were numbered the 15th and 16th; the former was commanded by Lieutenant-Colonel Reinbold, the latter by Lieutenant-Colonel Wagenheim. By the terms of their agreement they were to be on the same footing, with regard to pay, rank, and duty, as H. M.'s regiments in India. Each regiment to consist of ten companies, *viz.*, eight Fusilier companies, one Grenadier and one Light. The staff of each regiment to be 1 lieutenant-colonel, 1 major, 1 captain-lieutenant, 1 adjutant-major with the rank of lieutenant and 1 with the rank of ensign, 1 judge with the rank of lieutenant, 1 chaplain, 1 surgeon, 2 cadets, 5 surgeons' mates to rank as sergeants, 1 drum major as sergeant, 4 musicians as corporals, 1 armourer, 1 provost as private. Each company to consist of 1 captain, 2 lieutenants, 1 ensign, 3 sergeants, 1 clerk, 3 corporals, 2 drummers, 12 lance-corporals and 74 privates. Two guns to be attached to each regiment, for the working of which 1 sergeant, 2 corporals and 12 canoneers were to be provided. All ranks to agree to serve for seven years. The regiments to be governed by their own martial law, and in the manner prescribed by the Ordinances of the Electorate.

before the arrival of the French commander. The Admiral, however, declared that it was imperatively necessary for the ships to proceed to Bombay, and accordingly sailed on the 15th October. Twelve days after his departure Sir Richard Bickerton arrived, and having landed the troops he had brought from England sailed to join Admiral Hughes at Bombay.

On the 30th of the month the detachment of the Bengal European regiment embarked for Calcutta, and was thanked in General Orders for the eminent services they had rendered during the campaign.

Hyder,* whose health had been rapidly declining for some time past, expired on the 7th December, and was succeeded in the throne of Mysore by his eldest son Tippoo, better known to English readers as Tippoo Sahib. Tippoo was at this time on the western coast, and Lord Macartney urged General Stuart to take the field before he could return; but Stuart, at first professing to disbelieve the report, and afterwards acting with indecision, Tippoo was able to join his army at Chuckmaloor in south Arcot on the 2nd January, 1783.

On the 5th January the army was formed into two lines; the first, under Lieutenant-Colonel Reinbold of the 15th Hanoverians, consisted of three brigades.

First brigade, commanded by Lieutenant-Colonel James Stuart: H. M.'s 78th Regiment, H. M.'s 73rd, 78th and 101st Foot, detachment 15th Hanoverians, and the Madras European infantry.

Second brigade, commanded by Major Edmonstone, Bengal army: 12th and 25th Regiments Bengal Sepoys, and 8th Carnatic battalion.

Third brigade, commanded by Major Blane, Bengal army: 13th Regiment Bengal Sepoys, the Trichinopoly detachment, and the 16th Carnatic battalion.

The second line, under Lieutenant-Colonel Pearse† of the Bengal artillery, consisted of the 4th and 5th brigades, *viz.*:—

Fourth brigade, commanded by Lieutenant-Colonel Kelly, Madras army: 24th Regiment Bengal Sepoys, the 14th, 18th and 21st Carnatic battalions.

Fifth brigade, commanded by Lieutenant-Colonel Elphinstone: H. M.'s 73rd Regiment, 26th Regiment Bengal Sepoys, 4th, 15th and 16th Carnatic battalions.

Four regiments of native cavalry under Lieutenant-Colonel Dugal Campbell were also present with the army. No details regarding them are given in the orders.‡

The artillery consisted of the battering train, and of twelve 12-pounders and thirty 6-pounders, distributed amongst the several brigades.

* Hyder Ali was born in 1722, and was thus nearly sixty-one years of age when he died. He had reigned nearly twenty-two years.

† In May, 1782, Pearse obtained leave to proceed to Bengal, both to recruit his health and settle his accounts. Towards the end of July he sailed from Calcutta in a snow in charge of 20,000 pagodas for Madras; he reached Ganjam on the 31st August, and after some unavoidable detention proceeded from thence by land with the money to Madras, where he arrived on the 5th December, 1782.

‡ It is known that the regiments were very weak; those in camp in January 1781, did not number more than 200 men in each regiment.

Besides these there were the Bengal and Madras parks, each consisting of two 18-pounders, four 6-pounders and two howitzers.

Sir Eyre Coote had been invested by the Governor-General in Council with powers which made him almost independent of the Government of Madras in all matters connected with the conduct of the war. General Stuart imagined that with the command of the army similar powers had devolved upon him. This was denied by Lord Macartney, who insisted on assuming the direction of the campaign, merely assigning to the General the execution of his orders. Stuart, not content with expressing his disapproval of the scheme of operations proposed by the Governor, denied that the civil authority had any power over the King's troops. Both the General and Lord Macartney were men of unbending dispositions, and much valuable time was wasted in their unseemly squabbles. The General, however, having acquiesced in the advisability of destroying the forts of Carangooly and Wandiwash, at length marched from Madras for the purpose of carrying out this measure. The greater part of February was employed in the demolition of these two forts, and while in the neighbourhood of Wandiwash, Stuart offered battle to the combined French and Mysorean army. The challenge, however, was not accepted.* In the beginning of March Vellore was revictualled without opposition, Tippoo, on hearing of the capture of Bednore by the Bombay troops under General Matthews, having gone off with the greater part of his army to oppose that officer.

When intelligence reached Calcutta of the disputes between Lord Macartney and General Stuart, it was universally felt that Coote's return to Madras was necessary to avert disaster. The General was broken in body, and somewhat feeble in mind, "yet," wrote Hastings, "he is our only resource, and his presence would yet retrieve the miserable state of the Carnatic, even though he himself should be deprived of motion. He is willing, and sometimes impetuous, in his resolution to return thither." The General wished to return to Madras in the *Medea*, the frigate in which he had sailed to Calcutta; but for some reason or other this could not be arranged, and on the 7th March he embarked on board the armed ship *Resolution*. Ten lakhs of rupees, of which Coote was to have the control, were also shipped on board that vessel, and instructions were at the same time sent to the Government of Madras to allow him the uncontrolled command and conduct of the army.

The French admiral, aware of Coote's plans, kept four of his fastest sailing ships cruising about to intercept him. They fell in with the *Resolution*, and chased her for four days and four nights, sometimes getting close up to her. The General's anxiety was so great that

* The following general order was issued on the 15th February from Wandiwash after the enemy refused to fight:—

"It is supposed that the enemy, who would not stand to fight, will endeavour in a cowardly manner to annoy the army in the next march; perhaps they may throw some distant cannon shot and rockets as usual. The General will give five pagodas for every rocket boy taken by the flanking parties."

he took no rest, but remained almost perpetually on deck watching his pursuers. He frequently fainted, and at last, fairly worn out by fatigue and anxiety, was carried to his cabin. As the *Resolution* neared Madras the enemy abandoned the chase, and the good ship reached her destination on the 24th April. Sir Eyre Coote was taken on shore in a dying state, and expired two days after his arrival.*

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* Sir Eyre Coote was born in Ireland in 1726, and having adopted the army as his profession served in the suppression of the rebellion in 1745, but in what regiment is not certain. In 1754, however, he was a captain in the 39th Regiment, and sailed with that corps for India. The regiment reached Madras before the end of that year. On news of the capture of Calcutta by the Nawab Suraj-ud-daula in June, 1756, reaching Madras, it was decided to send an expedition to Bengal to recover Calcutta and restore the credit of the British nation in that province. Colonel Robert Clive was selected to command the expedition, of which three companies of the 39th formed a part. One of these companies was commanded by Captain Eyre Coote. He took a prominent part in the operations leading to the retaking of Calcutta, and especially distinguished himself at the capture of Chandernagore from the French in March, 1757. Clive immediately before the battle of Plassey in June of the same year assembled a council of war, and submitted to the council whether it would be prudent to come to action at once, or whether it would be more prudent to entrench the army and wait until the monsoon was over, when possibly the Mahrattas might be induced to join the British. Contrary to custom Clive gave his vote first, which was against coming to action, and in this opinion he was supported by twelve of the members. Coote, who had recently obtained the local rank of major, warmly espoused the opposite view, and was supported by six others. Clive subsequently reconsidered his decision and decided to fight at once. A month after the action Coote was sent from Murshidabad in command of a force of 223 Europeans and 500 sepoys to overtake and attack a body of French under M. Law. The French however retreated, and Coote followed them as far as Chupra, where he ascertained that the French were at Benares. As further pursuit would have led him into the territories of the Nawab of Oudh, Coote did not deem it prudent to proceed any further, lest the British should become involved in hostilities with the ruler of Oudh. The detachment accordingly returned to Murshidabad. In 1758 the regiment was ordered to return to England, such of the officers and men as desired being permitted to volunteer for the Company's service Coote returned to England, and early the following year was selected to raise a regiment for service in India. This regiment was numbered the 84th, and being formed by drafts from old corps was speedily completed, and by the end of October, 1759, the whole regiment had landed at Madras. The position of affairs on the coast was as follows: On the 17th February, 1758, Lally had been compelled to abandon the siege of Madras, and preparations were at once made to recover the districts which had fallen into the possession of the French. But little progress, however, had been made up to the time of Coote's arrival. He at once assumed command of the army, and commenced active operations. The fort of Wandiwash was taken on the 29th November, and Carangooly on the 10th December. On the 22nd January, 1760, Coote defeated Lally near Wandiwash; the victory was decisive, the enemy having been driven off the field with a loss of 230 Europeans killed or mortally wounded and 160 prisoners, amongst whom was Brigadier-General Bussy and twelve other officers. The forts of Chittapet, Timiri and Arcot were taken in the following month. The rock fort of Permacoil was carried by assault on the 5th March (see p. 145, No. 55 of this Journal). On the 5th April, the fort at Karikal was captured, and in it were found 155 guns, 9 mortars and a large quantity of military stores. Before the end of the year siege was laid to Pondicherry, and on the 15th January, 1761, the place surrendered at discretion. Shortly after this Coote returned to England. On intelligence of the death of Sir John Clavering reaching England Coote was appointed Commander-in-Chief in India. He arrived at Madras in December, 1778. Before leaving England he had been nominated a Knight of the Bath, and the insignia of the order was sent to the Nawab of the Carnatic with full instructions for the investiture of the General. Sir Eyre Coote was accordingly invested with the insignia by the Nawab. Sir Eyre landed at Calcutta on the 23rd March, 1779, and, as we have seen, sailed

The operations to be undertaken against Cuddalore were necessarily dependent on the return of the fleet from Bombay. Before that event Suffrein had captured a number of vessels from Bengal laden with rice, but anticipating that Admiral Hughes would return sooner than he actually did, leaving a few cruisers to intercept the grain ships from Bengal, he sailed for Trincomalee. Here he met the Marquis de Bussy with the last of the reinforcements from France, and without delay escorted him to Cuddalore, and then returned to Trincomalee to refit, and in the evening of the day he entered the harbour; he saw the British fleet making its way to Madras.

Having concerted measures with the Admiral, Stuart on the 21st April commenced his march towards Cuddalore. He advanced slowly, and had been much blamed for the dilatoriness of his movements; but, as Sir Thomas Munro has pointed out, he arrived at Cuddalore as soon as his store ships, and that his arriving there a month sooner would have been of no use, as his entrenching tools and heavy guns were on board these ships. Approaching Cuddalore from the north Stuart, when within an easy march of that place, made a circuit behind the Bandipollem hills, and on the 7th June took up a strong position two miles south of the fort, with his left resting on the Bandipollem hills and his right on a backwater close to the sea. The army was drawn up in two lines; the first consisted of the 1st, 2nd and 3rd brigades under Colonel Stuart, H. M.'s 78th regiment, and the second, under Colonel Gordon, H. M.'s 101st regiment,* of the 4th and 5th brigades. The next few days were employed in landing the heavy guns, entrenching tools and ammunition, and also a detachment of the 16th Hanoverian under Colonel Wagenheim.

Owing to the various misfortunes which had befallen the troops sent from France, the French commander now found himself at the head of a force, probably less than a fourth of the number he had hoped to have had under his command. The Mysore army, too, on whose co-operation he had counted, had moved to a distant country. According to French authorities the force under Bussy's orders amounted to no more than 2,300 Europeans and 5,000 natives. Seeing the position Stuart had taken up on the 7th, Bussy the same night commenced to construct a line of defence one thousand yards in front of the fort and running from the Bandipollem hills on the right to the backwater on the left. This defence consisted of a trench and parapet with three

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from thence in October, 1780, to take command of the troops in the field against Hyder Ali, and his subsequent career is fully detailed in the text. Coote's body was taken to England and interred in the parish church of Rockwood in Hampshire, and a monument was erected to his memory in Westminster Abbey.

* On the 20th April an order from England had been published granting superior local rank to the field officers of the King's troops. By this order Pearse was superseded by Lieutenant-Colonels Stuart and Gordon, and was removed from the command of the second line in favor of the latter officer. Pearse strongly protested against this act, as the second line was composed entirely of Company's troops. General Stuart declined to reconsider his order, which was in violation of the instructions of the Court of Directors, who in a despatch, dated 7th February, 1781, had desired that the command of their troops should be preserved to their own officers.

redoubts and several batteries. These works were becoming so formidable that at a council of war held in the British camp on the 12th June it was determined to assault them without delay.

In the course of the afternoon the enemy's lines were reconnoitred by Lieutenant-Colonel Kelly of the Madras European regiment, who, making his way through some thick jungle on the Bandipollem hills, gained a spot from whence he had a complete view of the interior of all the entrenchments on the right of the line of defence. Stuart on receiving Kelly's report determined to assault these works on the following morning.

The arrangements for the assault were as follows: Lieutenant-Colonel Kelly, with a detachment of artillery and eight field pieces under Major Mackay, the Madras European regiment and the 5th, 18th and 21st Carnatic battalions, was to leave camp before midnight, and following the same route as he had taken in his reconnaissance gain the right flank of the enemy's advanced works before daylight. The corps of European Grenadiers under Lieutenant-Colonel the Hon. Charles Cathcart,* H.M.'s 73rd regiment under Captain Lamont,† the 13th Bengal Sepoys and the 16th Carnatic battalion formed the left attack, and was commanded by Colonel James Stuart, H. M.'s 78th Regiment. The centre attack was entrusted to Major-General Bruce. The troops under his command were H. M.'s 101st regiment, detachments 15th and 16th Hanoverians, 25th Bengal Sepoys, the Trichinopoly detachment and three companies of the 20th Carnatic battalion under Lieutenant Desse. Major Edmonstone with H. M.'s 78th regiment, the 12th Bengal Sepoys and 8th Carnatic battalion was posted on the British right to act as circumstances might require.

Kelly had noticed a little hill, which the enemy had not occupied and from whence their works could be enfiladed. Marching from camp at the appointed time he sent Major Mackay with the field pieces and some sepoys and pioneers to take possession of this hill, Kelly with the main body of his brigade remaining behind the hill. At daybreak Mackay opened fire from his guns on the enemy's nearest post, which was held by some Mysoreans, who instantly took to flight, abandoning their guns. Kelly at once pushed on, and drew up his Europeans in rear of the abandoned work. Owing to the difficulty of the road he was not at once joined by the sepoys of his brigade. Without waiting for them he

* Lieutenant-Colonel the Hon. Charles Cathcart, 98th Regiment, born December, 1759, and obtained a commission at an early age. He served in America, and while on his voyage home to England was captured by a French privateer. When the 98th Regiment was raised he was appointed major, and sailed with it for India, and on the 20th April, 1783, became a local lieutenant-colonel. On the 11th June the Grenadier companies of the 73rd, 78th, 101st, 1st Madras European regiment, and detachment of Hanoverians were formed into a Grenadier corps, and placed under his command After the conclusion of peace he was sent home with despatches, and as a reward for his services was appointed quarter-master-general of the King's troops in India, and the Court of Directors voted him a sword of the value of one hundred guineas. In 1788 he was sent on a mission to China, but died on board the *Vestal* frigate in the Straits of Sunda, on the 10th June, in the twenty-ninth year of his age.

† Numbering under 500 men.

continued his advance, and the enemy, thoroughly taken by surprise, retreated to the nearest redoubt.

On hearing of Kelly's success the left attack was ordered to advance to his support, and by a little after 8 o'clock the corps of Grenadiers took up a position in front of Kelly's brigade and facing the enemy's right redoubt. They did not, however, reach this spot without loss, for the enemy brought a heavy fire from the redoubt to bear upon them in their advance. The guns from a British battery now opened upon the redoubt, and soon silenced its fire. The Grenadiers then advanced to storm the redoubt, but the French, again standing to their guns, poured volleys of grape into their assailants, and forced them to retire. Colonel Stuart reached the entrenchment just after the repulse of the Grenadiers, and sent to tell the General how matters stood.

On receiving this report General Stuart decided to make two simultaneous attacks on the redoubt, one on its front and the other on its right face. The former was to be undertaken by the troops under Major-General Bruce and the latter by those under Colonel Stuart. The Europeans of both parties were to advance without their guns, and Major Mackay was directed to bring his guns to bear upon the redoubt for three minutes, when the signal for the advance was to be given. On the signal being given the troops for the front attack moved forward in the following order, commencing from the right : the 25th Bengal Sepoys, four companies H. M.'s 101st Regiment, the Hanoverians and the three companies 20th Carnatic battalion under Lieutenant Desse.

The advance was over heavy sand, and the 101st had to pass through a grove of palmyra trees, and as the leading files emerged from the grove, at a distance of two hundred yards from the redoubt, they were greeted with a hot fire from the enemy's guns, whilst their infantry, who had lined the entrenchment to the right and left of the redoubt, reserved their fire until the British were within a hundred yards, and then gave them a volley, followed by a second when they had advanced some thirty yards closer. The Hanoverians now halted, fired a volley, and then the greater portion of them ran away. Two companies of the 101st were still in the palmyra grove ; they were seized with panic, and joined the Hanoverians in their flight, and broke through the reserve. The flank company of the 101st, however, continued its advance, and many of the men were killed at the foot of the redoubt.

The French, sallying out of the entrenchments and redoubt, dispersed the few Hanoverians who still stood by their officers, followed them up to where the 101st had been rallied, broke the latter, and drove both the Hanoverians and British through the sepoy reserve, and continued the pursuit for a quarter of a mile. Here, however, a stand was made, and the French forced to retire. The three companies of the 20th Carnatic battalion had retired in disorder at the same time as the Hanoverians, but had rallied. The French in their ardour to pursue the British had left no troops in the redoubt, and Lieutenant Desse, perceiving this, advanced and took possession of it.

It had been intended that the redoubt should have been attacked simultaneously by the troops under Major-General Bruce and Colonel Stuart, but from some misunderstanding the latter did not advance until Desse was in possession of the redoubt. On reaching the redoubt he ordered that its gorge should be closed and its defences reversed, and then, rapidly advancing with the Europeans on the right and the 13th Bengal Sepoys and 16th Carnatic battalion on the left, drove the enemy from the adjacent parts of the entrenchment. The French, however, soon rallied, and taking cover behind some sand hills galled the Grenadiers and 73rd with their musketry, while four field pieces poured grape into the redoubt, the gorge of which had not as yet been closed. At last the Europeans, falling fast, and overcome with heat, fatigue and want of water, gave way and retired in disorder.* Their sepoys kept their formation, and fell back steadily. The firing on both sides then slackened, and between four and five o'clock entirely ceased.

Thirteen guns and the key of the enemy's outworks remained in the hands of the British, and the abandonment by the French of all their outworks during the course of the evening evinced their sense of the result of the operations of the day; but the fact that they were permitted to withdraw all their heavy guns unmolested attests how exhausted the British were by their victory. The troops on the right under Major Edmonstone had in front of them the regiment of Acquitaine, supported by artillery; these two forces contented themselves with keeping each other in check, and neither could send reinforcements to any other part of the field. The loss of the British this day was 613 Europeans and 352 natives killed and wounded. Amongst the killed was Lieutenant Durie of the 25th Bengal Sepoys, and Colonel Pearse was severely wounded in the thigh.

Towards the close of the day the French fleet had appeared in sight. Admiral Hughes, who was anchored about eleven miles south of Cuddalore, at once set sail in order to interpose his ships between those of the French and that place. The British fleet was superior to the French in that it had sixteen ships of the line and two of 50 guns against eighteen vessels of all classes of the latter. Scurvy, however, had made such havoc among the British seamen that their ships were but poorly manned,† whilst those of the French had their crews complete. On the morning of the 16th Hughes moved from off Cuddalore, hoping to be able to bring the French to action, but Suffrein, manœuvring with great skill, avoided a conflict, and by half past eight in the evening succeeded in anchoring precisely in the same place from which Hughes had sailed in the morning.

After a brief consultation between the French commanders it was decided that an attempt should be made to cripple the British fleet,

* The casualties in the 73rd this day were: Captains Alexander Mackenzie and the Hon. James Lindsay, Lieutenants Simon Mackenzie and James Trail, four serg·ants and eighty rank and file killed, and Captain John Hamilton, Lieutenants Charles Goorie, David Rannie, John Sinclair, James Duncan and John Sutherland, five sergeants and one hundred and seven rank and file wounded.

† Wilks, quoting from the annual register, says that in the healthiest ships were 70 to 90 men laid up with scurvy, and in others double that number.

so that it should no longer be a cause of apprehension, and thus permit of men being landed from the ships to aid in the defence of Cuddalore. The French general, calculating that the approaches of the besiegers could not be pushed on with a rapidity that would cause him immediate anxiety, embarked twelve hundred troops on board the ships during the night of the 17th. Thus largely reinforced Suffrein sailed to bring the British fleet to action. After a series of manœuvres the fleets engaged at about four o'clock on the afternoon off the 20th ; at seven the French hauled off, and at daylight the following morning were out of sight. The British had lost 91 killed and 431 wounded, and the spars of many of the ships were much damaged. Hughes, desirous of renewing the fight, went in search of the French fleet, and on the 22nd discovered it at anchor in the roads off Pondicherry. He anchored in sight of the French fleet, hoping it would come out and engage him, but Suffrein would not quit his position. The sickly state of his crews, the damaged condition of his ships and want of water at last compelled Hughes to sail for Madras, and no sooner had he left than Suffrein returned to his position off Cuddalore, and not only relanded the troops he had taken on board, but disembarked two thousand four hundred men from the fleet.

Before leaving Madras General Stuart had stated that he considered the army under his command sufficiently strong to reduce Cuddalore. At the same time he solicited a discretionary power over the army operating in the south. This latter force had been under the command of Colonel Lang of the Madras army, an old and experienced officer, but early in May he was superseded by Colonel Fullarton, H. M.'s 98th Regiment,* recently promoted to the rank of colonel by brevet, and who, by virtue of this brevet and agreeable to the rules then in force, took precedence of all colonels of the Company's service. Stuart's application had been reluctantly acceded to, and on the express understanding that it was only to be exercised in case of necessity. Before reaching Cuddalore, however, and without communicating to Government what he had done, Stuart ordered Fullarton to cross the Koleroon and there await further instructions. After the action on the 13th Stuart had directed Fullarton to join him without delay ; the latter officer had received peremptory orders from the Government of Madras to employ the troops under his command on another duty. Having heard, however, of the disembarkation of the men from the French fleet, and that the British troops were harassed with the duty in the trenches, Fullarton decided to march with all possible expedition to join General

* Colonel William Fullarton entered the army as a lieutenant-colonel. He had been private secretary to Lord Stormont at Paris, and afterwards obtained a seat in Parliament In 1780 some new regiments were raised, and he was appointed lieutenant-colonel of one of these, the 98th. The raising of these regiments, and the manner in which officers had been appointed to them, led to acrimonious debates in both Houses of Parliament. Lord Shelburne, after having said that the new regiments might be employed in buccaneering, and possibly against the constitution, referred to the appointment of Lieutenant-Colonel Fullarton, whom he designated as a mere "*commis.*" For this speech he was challenged by Fullarton; they exchanged shots without effect; on a second discharge Lord Shelburne, who fired in the air, was slightly wounded in the groin He expressed his willingness to receive another fire, but Fullarton declared himself satisfied.

Stuart, "conscious," as he wrote to the Madras Government, "that the public safety could have no existence if his army were defeated."

No sooner had Bussy been reinforced by the men landed from the ships than he determined to make a vigorous sortie. For this purpose three columns were formed ; two of these, however, were apparently only intended for false attacks to divert the attention of the British. The real attack was to be made by a column consisting of one thousand picked men under the Chevalier de Damas, Colonel of the regiment of Acquitaine.

The British approaches had at this time been carried to within eight hundred yards of the fort. A road to the fort ran through the British lines, and they had not only neglected to carry their trench across the road, but had taken no precautions to block the opening. The French commander had noticed this neglect, and Damas was ordered to make for the opening, and if possible get in rear of the British works. Two hours before daybreak on the 25th the Chevalier moved out from the fort, and advanced quietly but rapidly towards the British trenches, and a part of the column succeeded with but slight opposition in passing through the opening and getting in rear of the besiegers. This part of the trenches was manned by the 24th Bengal Sepoys, commanded by Captain James Williamson, and on them the brunt of the struggle fell. Early in the fight the colors of the 24th were captured by the French. The men fought gallantly, the front rank manning the parapet, while the rear rank opposed the French who had got in their rear, and many of the French fell by the bayonets of the sepoys. The British troops in rear promptly turned out, but it was still dark, and much confusion and wild firing ensued. A party of Grenadiers, however, made for the opening, and effectually closed it. Just at this time some drummers, nobody knew by whose orders, beat the Grenadiers march, and the whole British army being roused the French attempted to retreat ; but the Grenadiers, drawn up on the road, barred the return of those who had got in rear of the trenches, and forced them to lay down their arms, while the troops in the trenches, sallying out, pursued the rest of their assailants up to the fort. The loss of the French was estimated by General Stuart at four hundred and fifty, and Wilks, the historian, says that he does not think that this estimate was too high. The French, however, only admitted a loss of eighty taken prisoners and twenty killed, but as one hundred and fifty prisoners remained in the hands of the British no reliance is to be placed on the French returns. Amongst the prisoners were the Chevalier de Damas and Bernadotte, afterwards King of Sweden, but at this time a sergeant in the regiment of Acquitaine. The loss of the British was trifling. Major Cotgrave of the Madras army was killed, and three officers were returned as wounded and missing ; twenty rank and file, chiefly sepoys, were killed and wounded. The 24th not only recaptured their colors, but took two from the enemy. Lieutenant David Ochterlony* of this regiment was wounded and taken prisoner by the French.

* Afterwards well known in Indian history as Major-General Sir David Ochterlony, Bart., G.C.B

Inclusive of the sailors landed from the fleet the besieged now outnumbered the besiegers. Sickness and fatigue, moreover, had so reduced the British force that Stuart was unable to invest Cuddalore, and Bussy, with the help of his Mysorean allies, was able to keep up communication with every part of the adjacent country except that actually held by the British troops. Considering that the sortie had failed merely owing to errors incident to operations undertaken in the night, he determined, after allowing his assailants a few more days for the exhaustion of their strength, to march out in force by a circuitous route and attack them in rear.

Stuart was fully alive to his critical position ; his men were overworked, provisions were not only scarce but bad, and with the exception of the gun bullocks killed in action but little meat was to be procured. In his correspondence with the Madras Government he complained bitterly of their silence on every subject, above all relative to the succours he had applied for, both from Madras and from the south. Private letters from Fullarton's camp, moreover, had been received saying that his orders to that force had been countermanded by the Madras Government, and that it had been directed to proceed in another direction. The outlook was gloomy in the extreme ; the retreat of the force with the loss of its battering train was the most favorable result that could be anticipated.

Admiral Hughes was preparing to engage Suffrein* for the sixth time, when news reached Madras that preliminaries of peace between Great Britain and France and her allies had been signed at Versailles on the 1st January. Lord Macartney at once despatched Mr. Sadlier, the second member of council, and his private secretary Mr. Staunton in the *Medea* frigate to Cuddalore to inform Bussy of the treaty of peace between the two nations, and that the commissioners were charged with instructions to the British army to abstain from further hostilities. No information relative to the peace was sent direct to Stuart, and the French would permit no communication between the frigate and the shore.

Stuart, indignant at the neglect with which he had been treated, wrote on the 1st July, complaining that the *Medea*, with her cartel flag flying, was anchored in the midst of the French fleet. "They continue their working parties," he wrote ; "we fire upon them, and they return the compliment as usual. No message of any sort has been sent to us, and, though I am Commander-in-Chief and a member of your Government, I neither have any communication, nor have I had any communication later than the 17th June, and yet there are twenty letters in camp as late as the 25th." The chief difficulty

* On his return to France Suffrein was received with distinguished honors. Medals were struck to commemorate his fame, and, when he went to the palace to pay his court to the King, he was received with special honors. He was made Chevalier des Ordres du Roi, and the dignity of Vice-Admiral was expressly created for him for his life. He died about the year 1792. In view of recent events it is interesting to note that Suffrein strongly advocated the formation of a French settlement in Pegu, as he considered that the British in India could be attacked from that quarter with the best chance of success.

which the commissioners experienced arose from an attempt by the French to procure a cessation of hostile movements on the part of the British against Tippoo before it was known whether he would consent to a proposed armistice for four months. This point was at last settled, and the commissioners landed on the 2nd July and announced the cessation of hostilities to General Stuart, and then re-embarking sailed the following day for Madras to submit their report to Lord Macartney.

The Government of Madras approved of the arrangements made by the commissioners, and sent a copy of a letter to that effect to all officers commanding troops in the field except General Stuart. He was directed to make over command to Major-General Bruce, and to return to Madras to explain his dilatory conduct of the campaign, his alleged interference with the force under Fullarton and other matters. Stuart at first declined to make over command, but at last issued an order making over command of the Company's troops to General Bruce, but retaining that of the King's troops to himself, and having done this set out for Madras.

Fullarton had arrived within three forced marches of Cuddalore when he heard of the cessation of hostilities. He now halted, and shortly afterwards received orders to return to the south.

All arrangements, consequent upon the peace having been satisfactorily settled, the heavy guns and stores were embarked for Madras, and the troops commenced their return march to the same place. While the army was on the march General Bruce's health compelled him to quit the camp, and ultimately to embark for England. On the arrival of the army within a short distance of the Mount, Major-General Sir John Burgoyne arrived in camp and assumed command. The disputes between General Stuart and Lord Macartney continued daily to increase in bitterness, Stuart denying that the latter had any authority over the King's troops. At last Stuart's conduct became so violent that Lord Macartney had reason to believe that an attempt would be made to arrest and depose him as had been done with Lord Pigot in 1776, and in which arrest Stuart had been one of the principal actors. He, therefore, took the extreme step of dismissing Stuart from the Company's service.

Stuart's dismissal was notified to the army on the 17th September, and the order concluded with directing Major-General Sir John Burgoyne as the senior officer of His Majesty's service on the coast to assume command of the King's troops. General Stuart refused to give up the command, and Burgoyne informed Government that he would continue to obey him. It was, therefore, decided to arrest Stuart before he could commit any overt act; he was accordingly arrested the same day by the fort adjutant and a party of sepoys, and conveyed to the fort. At the same time Colonel Ross Lang, of the Company's service, was promoted to the rank of lieutenant-general, and directed to take command of the troops in camp. The major-generals of the King's service, however, refused to obey him. An order was then issued by Lord Macartney explaining the legality of the appointment, and calling

upon all officers of inferior rank to obey the newly-created lieutenant-general.

Soon after reaching the camp Lang ordered that the army should march the following day. Upon this the King's troops withdrew their orderlies from the adjutant-general's office. The brigade-major refused to go for orders, and the officers said their men should not move. Burgoyne sent a letter to Lang asking him to postpone the march until he had time to consider. Lang refused to comply with this request, and Burgoyne with three or four senior officers left the camp at midnight without permission. Lieutenant-Colonel Mackenzie, H. M.'s 73rd Regiment, went to Lang early the next morning, and said that he was ready with His Majesty's troops to obey his orders, and the army accordingly marched. A few days after Major-General Campbell, 36th Regiment, and Major-General Oyle, 52nd Regiment, two of the officers who had quitted camp with Burgoyne, tendered their services, having been satisfied that the authority of General Stuart over the King's troops only existed by virtue of his commission from the East India Company.*

Shortly after Stuart's arrest it had been decided to send him to England, and on the 14th October he was put on board the *Fortitude* packet, his cabin having been fitted up with every possible convenience and wines, livestock and stores of every kind shipped for his use on the most liberal scale.† Burgoyne now assumed the separate command of the King's troops, and this assumption was not opposed. However he soon commenced issuing orders in direct opposition to Government, and persisting in this conduct he was placed in arrest on the 31st

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* Some idea of the feeling which existed at Madras at this time may be gathered from the following extracts of letters written by Colonel Pearse of the Company's and Colonel Fullarton of the King's service. The latter officer was an intimate friend of Lord Macartney's, and was his second in the duel he fought with General Stuart on his return to England. Pearse in a letter to a friend says: "In regard to the seizure of Stuart, when he wanted to set the King's and Company's troops at variance, Macartney is absolutely right; so I have told Hastings, and so I think he was in dismissing him. If he had not been seized there would have been a civil war here." Colonel Fullarton wrote: "Sir John Burgoyne succeeded as Commander-in-Chief of the King's troops. He asserted powers and privileges that the Government declared to be incompatible with the constitutions of the Company. He persisted, and was superseded by a colonel on the Company's establishment, who, on this occasion, was raised to the rank of lieutenant-general and commander-in-chief upon the coast. Sir John Burgoyne, in consequence of this promotion, claimed the exclusive command at least of the King's troops, and was arrested. Another general became senior of the King's service, and submitted. The remaining generals had signed a remonstrance against the violation offered to the royal service by the arrest of their commanders. Some of them adhered to their declarations and left the country; others, pliant to the times, enjoyed the benefits of unservicable, but not unprofitable, stations."

† Shortly after Lord Macartney's return to England he was challenged by General Stuart. They met on the 27th June, 1786; Colonel Fullarton was his lordship's second, and Colonel Gordon, General Stuart's. Lord Macartney was slightly wounded. General Stuart called out, "This is not satisfaction," and asked if his lordship could not fire again. Lord Macartney replied that he would try to do so with pleasure. The seconds, however, refused to allow the duel to be continued. It was said that General Stuart meditated renewing the dispute at a future time, but further proceedings were stopped by a special injunction from the King.

December, 1784,* and the command of the King's troops devolved on Major-General Allan Campbell.

While the senior officers of the King's service were disputing with Government the officers of the Company's service had a serious grievance of their own. When the 39th Regiment was sent to India in 1754 it was stipulated that the officers of the regiment should take precedence of the officers of the Company's service of the same rank. The same stipulation had been made when other regiments were sent to India. Irritating as was this supersession the senior officers were now subjected to a still more galling supersession by the granting of brevet and local rank to all the field officers of the royal service. The order for this rank was promulgated the day before the army marched for Cuddalore. Pearse was the first to suffer, being removed from the command of the second line, the command of which was given to Colonel Gordon, H. M.'s 101st Regiment, who obtained the rank of colonel under the new order. There were but few field officers on the Madras establishment at this time, and the extent to which officers of the Company's service of field rank were superseded may be judged from the fact that of the King's service three colonels (regimental lieutenant-colonels) and two colonels (regimental majors) were promoted to the rank of major-general, seven officers to that of colonel, and nine to that of lieutenant-colonel.

The captains and subalterns of H. M.'s 73rd Regiment had also a grievance in common with the officers of those grades in the Company's service, and this was the extreme youth of many of the officers of the regiments which had recently arrived from England. Pearse in one of his letters states that the senior captain of the 101st was only twenty years of age and the second captain only eighteen. In a letter forwarding a memorial from the officers of the Madras army, General Lang mentioned that a subaltern of fourteen years' service had been superseded in the command of a piquet by a lieutenant of the King's service who was only fourteen years of age, and that an experienced captain of seventeen years standing had been commanded by an officer of twenty-six months' service, and who had but recently landed in the country.

Tippoo, as we have seen, on hearing of the capture of Bednore by the force under General Matthews, had marched to oppose that officer, and with his numerous army soon succeeded in surrounding Bednore and cutting off Matthew's communication with the sea. At last the garrison was driven into the citadel, and after a brave defence capitulated on favorable terms. When Tippoo entered Bednore he went direct to the treasury, and finding it empty ordered that the British officers should be searched, and, as large sums of money and jewellery were found on some of them, he declared that the terms of the capitulation

* This officer was Sir John Burgoyne, Bart., of Sutton Park, Bedfordshire, and is not to be confounded with General Burgoyne who commanded a force in America and surrendered to General Gates in October, 1777. Sir John Burgoyne was tried by court-martial about June, 1786. He was acquitted, and immediately afterwards returned to England.

had been violated, and Matthews and his officers were placed in irons and sent to various fortresses in Mysore.

After the capture of Bednore Tippoo, aided by a detachment of French troops under M. de Cossigny, laid siege to Mangalore, and sent a division of his army to besiege Onore. The garrison of the former place was commanded by Lieutenant-Colonel Campbell, H. M.'s 42nd Regiment, and of the latter by Captain Torriano of the Bombay army. Both places were most gallantly defended, but a detailed account of the heroic conduct of the defenders would be out of place in this article. When the sieges had been in progress for some weeks news was received of the peace between Great Britain and France, and that, by one of the articles of the convention with Bussy, it was proposed that the native powers should have four months given them to adjust their differences and fall in with the treaty concluded between the two great European powers.

Tippoo was furious on hearing of the peace, and his anger was increased by the fact of Bussy having sent orders for the French troops to quit his camp, which they immediately proceeded to do. Finding entreaties and threats alike of no avail to prevent the march of the French, and dreading lest they should combine with the British against him, he at last reluctantly consented to the four months' armistice. Brigadier-General Macleod, who had been sent to relieve Mangalore, was beguiled by Tippoo, and did nothing effectual to aid the garrison, and Tippoo, while the armistice lasted, took care that no more supplies should reach them at a time than were sufficient for a day's consumption, and so increased the cost of everything that a fowl was sometimes sold for twelve rupees.

After the conclusion of the armistice the garrison was reduced to great straits for want of food; many of the sepoys were afflicted with night blindness, which was attributed to a diet consisting solely of rice, and so scarce had food become that horse flesh, snakes, rats and mice were eagerly devoured. At last, when two-thirds of the garrison were in hospital, and the deaths were averaging twelve a day, Campbell proposed to capitulate. Tippoo, desirous of putting an end to a siege, which by death and desertion had cost him half his army, granted favorable terms. On the 31st January, 1784, the garrison, reduced to 235 Europeans and 619 natives, quitted the fort with their arms, and marched for Tellicherry.*

Immediately the terms of peace with the French had been settled Fullarton had been ordered to retrace his steps and re-occupy Dharapuram, which place he had captured on the 2nd June. He was reinforced by troops from the army under General Bruce, and his force brought up to a strength of 13,636 men, of whom 2,000 were Europeans. He was directed to abstain from hostilities against Tippoo until he should receive instructions to resume the offensive, or hear that the armistice had been violated. In the meanwhile the troops were not idle,

* Campbell died, on the 15th March, of sickness contracted during the siege, and in commemoration of his services the East India Company placed a tablet to his memory in the Cathedral of Bombay.

as several refractory Poligars had to be coerced, and stores of every kind were collected in readiness for a move against the capital of Mysore.

Tippoo at Mangalore having violated the armistice, Fullarton, on the 18th October, was directed to attempt the relief of that place in conjunction with a force to be assembled at Tellicherry. After hearing that the latter would not be able to move from Tellicherry for two months, he decided that the most effectual way to relieve Mangalore would be to threaten Tippoo's capital. To this end he determined to reduce Palghat and make it a depôt for stores and supplies. Acting on this determination he marched for Palghat, and having reduced some petty forts by the way arrived before that place on the 4th November. On the night of the 13th Captain the Hon. T. Maitland, 78th Regiment, was on duty in the trenches, and, taking advantage of a heavy fall of rain, he drove the defenders from the covered way. Following up his success he pushed on to the second gateway ; here his onward progress was checked, but he maintained his ground until reinforced, when the enemy asked for quarter. This was granted, and the fort was made over to the British. Treasure amounting to Rs. 1,75,000 was found in the place, and in consideration of the necessities of the troops Fullarton divided this money among them.

Leaving a garrison at Palghat he advanced to Coimbatore, which surrendered after a mere show of resistance. Fullarton now made arrangements to move against Satyamangalam and from thence to Seringapatam, hoping to gain possession of that place while Tippoo was detained before Mangalore. His preparations had been completed, and he was about to march, when, on the 28th November, he received instructions from the commissioners appointed by Lord Macartney to negotiate peace, to restore all the places he had taken, and to retire within the boundaries possessed by the British on the 26th July.

As far back as the 12th February, and before Tippoo had left the coast of Coromandel, Lord Macartney had engaged a Brahman to communicate with his friends in the service of Mysore, and endeavour through their means to obtain better treatment for the British prisoners in Tippoo's hands, and also through the same medium to ascertain whether he was disposed to separate from his French allies and enter into a treaty of peace with the British. This proceeding met with Hastings' strong disapproval, as he considered that an apparent anxiety for peace would have a bad effect. This negotiation fell to the ground. Again, immediately after the terms of peace with the French had been settled, Lord Macartney wrote to Tippoo, telling him he had agreed to an armistice for four months, and that, pending the receipt of a communication stating his willingnes to adhere to the agreement, all hostilities on the part of the British would be suspended. This letter was despatched from Madras in the first week of July, but it was not until the 5th October that a reply was received, and by this time the Sultan's plans for starving the garrison of Mangalore into surrender were approaching maturity. The letter was full of amicable assurances, but contained no definite proposals. His envoy now proposed that two gentlemen of position should be deputed to his

master's court with full powers to conclude a treaty without having to refer to Madras. This was agreed to by the Government, who described the proposal as "fully meeting their wishes." To Tippoo it was particularly acceptable as showing to the native powers the British in the character of suppliants for peace.

The gentlemen selected as commissioners were Mr. Sadlier and Mr. Staunton. They left Madras on the 9th November with the prospect of bringing their negotiations to a favorable issue, considerably increased by the receipt of intelligence that Tippoo had signfied his agreement to the treaty of Salbye,* both to the Peishwa and Sindia. On the 19th they reached the camp of the commander of the Sultan's troops in Coromandel, and from thence sent the order to Fullarton before referred to. On receiving this order Fullarton at once suspended hostilities, but declined to give up his conquests without further orders, wisely considering that by doing so he would be throwing away the surest means of obtaining an advantageous treaty.

One of the principal objects to be gained by the commissioners was the release of the British prisoners; but Tippoo raised objections, and stipulated that the surrender of Mangalore should precede the release of the prisoners. Mr. Sadlier was willing to consent to the Sultan's terms, but Mr. Staunton doubting Tippoo's good faith was opposed to the surrender of Mangalore until the prisoners had been released. This disagreement in opinion necessitated a reference to Government, and to obviate the necessity for reference, should the commissioners again disagree, a third member, Mr. Hudlestone, was appointed. Fullarton was now peremptorily ordered to restore his conquests, and in obedience to these instructions he evacuated Coimbatore.

In the meanwhile the commissioners had been proceeding to the Sultan's camp before Mangalore, every precaution being taken to prevent their having any communication with the British prisoners in Mysore, and their progress was delayed as much as possible. At length, when within twenty miles of Mangalore, they heard that the place had surrendered. On arriving at Tippoo's camp they were subjected to every indignity, and three gibbets were erected in front of their tents.

The Government now became alive to the error that had been committed in ordering Fullarton to relinquish his conquests. He was therefore directed "not only to retain possession of Palghat should that fort not have been given up, but to hold fast every inch of ground of which he was in possession till he should receive accounts of the negotiations." At the same time preparations were made for renewing the war in other directions. Tippoo, hearing of these preparations, and knowing that by his practical rejection of the treaty of Salbye he was exposing his dominions to a combined attack by the British and Mahrattas,

* Signed on the 17th May, 1782, by Mr. Anderson on the part of the Company, and by Sindia on behalf of the Peishwa and Mahratta chiefs. By the terms of this treaty Hyder was to be required to relinquish all his conquests in the Carnatic, and to release all his prisoners within six months, and in case of refusal was to be attacked by the forces of the Peishwa. It was not, however, until the death of Hyder that the Peishwa's seal was affixed to the treaty.

was induced on the 11th March, 1784, to sign a treaty of peace.* The terms of this treaty were discreditable to the British, and as might have been anticipated led in the course of a few years to another war.†

While the negotiations were in progress the Bengal troops remained in camp near Madras. At this time, although the European soldiers received their pay punctually, the sepoys were many months in arrears. A daily ration of rice was issued to them, but everything else they required had to be bought on credit. At length the Bengal Sepoys broke into mutiny. It was occasioned, says Pearse, by a payment having been made to the Madras troops while no similar payment was made to those from Bengal. Pearse obtained part of a month's pay and sent it to the camp, at the same time desiring that the men might be informed that the balance of the month's pay would be issued in the course of the week.

On Christmas evening Pearse's palanquin was surrounded by the sepoys. Springing out he wrested a sword from a man who had hold of the palanquin, and seizing him declared he would put him to death if another man approached. On questioning the sepoy he said they had heard he was going away, when they would be left without a protector, that the Madras troops had been paid for a month while they had only been offered pay for a portion of the same month, though both were eight months in arrears. After this Pearse released the man, and made him over to his orderlies to be taken to the fort. He was, however, rescued by the other sepoys.

Next day Lieutenant-Colonel Blane sent to Pearse to request that he would return to camp, as the men declared they would not take less than four or five months' pay. Pearse instantly returned to camp, and was received with shouts of joy. He at once sent selected men amongst the sepoys to declare his displeasure at their behaviour, "which disgraced both him and them, and was to no purpose, because the money could not be obtained; if it could have been they would not have been kept in arrears." That night Captain Williamson issued the instalment to the men of his battalion, two

* Some little time after the treaty had been signed Lord Macartney and Mr. Sadlier became involved in a dispute. Mr. Sadlier, it was alleged, had concurred in a particular act of Government. Mr. Sadlier denied it. Lord Macartney reiterated the assertion in terms conveying an imputation of falsehood. A challenge from Mr. Saldier was the consequence, and in the meeting which ensued Lord Macartney was slightly wounded in the left side.

† It was based on the principle of a restitution of conquests, but no redress was obtained for the atrocious treatment of the British prisoners by Tippoo Sultan. Hyder Ali had treated them with a cruelty which manifested an utter disregard to the preservation of their lives; Tippoo did not hesitate to employ direct means to deprive them of existence. Captain Rumley, who led the charge against Tippoo's guns on the day of Baillie's defeat; Lieutenant Fraser, one of Baillie's staff; Lieutenant Sampson, an officer of distinguished gallantry, and many of the officers taken at Bednore died in captivity, and not from natural causes. On the 15th April 1,200 Europeans, including officers, about 3,000 sepoys and several hundreds of servants and camp followers who had been confined at various places in the Sultan's dominions were made over to Captain, afterwards Lieutenant-General, Sir Thomas Dallas, G.C.B., the officer appointed to receive them. Although it was known that there were more British-born subjects in confinement, and that of at least 100,000 inhabitants of the Carnatic who had been carried off into Mysore only 2,000 had been restored, the Government was too eager for peace to take any effectual measures for their release.

men of the 13th Regiment threatening to fire upon them if they took it. The next day all the sepoys received their instalment except one man, who was at once turned out of camp. The man who had seized Pearse's palanquin, and the two men who had threatened to fire on the others, were tried and punished, and order was restored.

No sooner had the treaty been signed than it was decided that the Bengal troops should return to their own Presidency, and on the 19th April a general order was published, expressing the high opinion entertained by the Madras Government of the good services performed by the detachment and of Colonel Pearse, by whom it had been so efficiently commanded.

The pay of the men was at this time nearly ten months in arrears, but pay for one month having been issued the detachment, on the 22nd April, 1784, commenced its return march. On the 4th May it reached Nellore; here orders were received to send back the European artillerymen and lascars in order that they might return to Bengal by sea, and also to leave the guns and ordnance stores at Nellore. On the 10th the detachment resumed its march, and the next day Pearse received instructions to take on the guns and stores.

The reason for the latter order was as follows: The Madras Government had determined to keep up the cavalry of the Nawab of the Carnatic which had been in British pay during the war. The men claimed nearly two years of arrears of pay from the Nawab, for a period antecedent to their being taken into the Company's pay. Their demand not being complied with they seized their officers, both European and native, and took possession of Arni, from the walls of which place they fired on General Lang, and threatened to put their European officers to death if they were not paid the arrears they demanded. Nellore was one of the Nawab's military stations, and it was anticipated that the troops there might also mutiny. It was therefore deemed impolitic to leave the guns at that place. It was further considered advisable that the guns and field equipments should be again made over to the Bengal detachment, so that it might be in readiness for active service. A few days later orders came that the guns were to be left at Masulipatam.

On the 1st June the detachment reached Ellore. The rains had now set in, and sickness had so increased that a hundred and fifty men were unable to walk. Pearse had made repeated applications for money, both to Madras and Calcutta, but the treasuries at both places were empty. The men, although their pay was ten months in arrears, had since leaving Madras shown no signs of discontent. At Ellore, however, they met a body of troops who had been paid up to date, and contrasting their condition with that of this favored detachment they became discontented and murmured loudly. Pearse with difficulty succeeded in getting a lakh of rupees, and issued one month's pay. "But," said he in his report, "some officers are not paid, and I myself have not had a rupee, though I am in very great need of cash, even for my table."

On the 6th June the detachment reached the Godavari, and Pearse with a part of his staff crossed that day, but owing to a rise of the river, and want of boats, it was not until the 13th that the whole of the troops were across. On reaching Peddapur a further supply of cash was obtained, and the men were paid for August, September and October, 1783.

On the 25th June Pearse was directed to halt at Chicacole until after the rains, or until the weather would admit of his continuing his march without risk to the health of the men. On the 29th June the detachment reached Vizagapatam, and remained there until cantonments near Bimlipatam had been prepared. It remained at Bimlipatam until the 31st October, when the rainy season having terminated the march to Bengal was resumed.

The detachment reached Vizianagram on the 1st November, Ganjam on the 22nd, Cuttack Island on the 10th December, and on the 31st December encamped at Midnapore on the ground where it had originally been formed to proceed on service. From hence Pearse reported his arrival to Brigadier-General Stibbert, the provincial Commander-in-Chief, and stated his intention of remaining at Midnapore for a few days and then marching *viâ* Burdwan to Ghyretti. After a brief halt the detachment continued its march, and reached Ghyretti in the middle of January, 1785.

On the 22nd January a general order was published detailing the rewards it was intended should be bestowed on the detachment which had proceeded to the west coast under Brigadier-General Thomas Goddard and the detachment under Colonel Thomas Deane Pearse.*

On the 25th January Warren Hastings, the Governor-General, visited the camp at Ghyretti, and issued an order, which concluded as follows: "The Governor-General has deemed it incumbent upon him to visit the detachment in person, to offer his thanks to them before their separation; and desires that the commanding officer, whom he is proud to call his friend, will make them known in public orders to the officers, his countrymen, and to the native officers and private sepoys of the detachment. The term of his public existence is now within a few days of its close. But it is a consolation to him thus to mix with his regrets for the loss of a service endeared to him by many years of care, attachment and vicissitudes, a declaration of justice and gratitude marking its last period."

The following day the Governor-General recorded a Minute, proposing that the British officers of the detachment should receive some token of the approval of Government, and recommended, first, that swords should be presented to Colonel Pearse and Lieutenant-Colonels Edmonstone and Blane; secondly, that all officers should be confirmed in the appointments in which they were acting; and thirdly, "that the names of the officers be entered on record for such future marks of the favor of Government as the rules of the service may admit; and to this list may be joined on the same principle that of the officers who

* This order is quoted at p. 170, No. 60, Vol. XIII, of the Journal of the Institution published in September, 1884, and an illustration of the medal granted under this order is given at page 160 of the same volume.

have lately served with the other great detachment returned from the other side of India."

"This," continued the Governor-General, "is the last appeal which I shall make to my present colleagues in the administration, and I venture to declare, without consulting them, that the sentiments of one are similar to my own from the same impulse, excited by the personal meeting with men so deserving, and among them some veterans who were once his associates in the same career of military enterprise; and that those of my successor* will be not less favorable when, to the spirit of liberal discernment, he shall have joined the same personal motives as those which I have ascribed to myself and Mr. Stables."†

The detachment was now broken up. Colonel Pearse resumed his appointment of commandant of the Bengal artillery. Captain Richard Scott was confirmed in the command of the 26th Regiment; Lieutenant David Ochterlony was appointed Judge Advocate-General of a division of the army, and several other officers were similarly rewarded.

[The works chiefly consulted in the compilation of this article were: Williams' History of the Bengal Native Infantry; Wilson's History of the Madras Army; Historical Record of the 1st Madras European Regiment; Wilks' History of Mysore; A View of the English Interests in India, by William Fullarton of Fullarton, late commander of the southern army on the coast of Coromandel; Auber's Rise and Progress of the British Power in India; Rennell's Memoir of a Map of Hindoostan; East India Military Calendar; and a Memoir of Colonel Thomas Deane Pearse, published in the British India Military Repository.]

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* Mr., afterwards Sir, John Macpherson, who continued to act as Governor-General until the arrival of Lord Cornwallis in September, 1786.

† John Stables, Esq., member of Council, formerly in the army, and commanded a battalion of sepoys at the battle of Buxar.

INFANTRY DRILL.

By Lieut.-Col. C. McD. Skene, *43rd Goorkha Light Infantry.*

The principal object of drill, as applied to battalion and brigade exercises, is to enable bodies of troops to move rapidly and in good order from one position to another; and the reason why it is so difficult is chiefly because movements can be done in so many different ways, so that an officer, when called upon to carry out any movement, has to think over the different methods and to consider which of them is likely to be most suitable.

It will possibly be found that these different ways of obtaining the same end may easily be brought in all or most cases to one, which would not only tend to greatly reduce this difficult part of drill, but also very much reduce drill as a whole, while still retaining the advantages possessed by the present system.

Our fighting formation is line, column and other formations being used in the field for purposes of intermediate movements; so that a battalion in line having to move into a position, say one mile to the front, and facing half left of the original front, would do so by intermediate formations of some kind.

Now this may be done in a variety of ways according to the present drill. Among them may be mentioned:—

Advancing in oblique echelon, and changing front, or forming line obliquely; advancing in fours from flanks of companies, reforming line, and changing front.

Advancing in column from any company and forming line obliquely, or changing direction and forming line on the front company.

Advancing in quarter column, and changing direction into new alignment.

Advancing in double column. These may be done either from the halt or on the march.

There are others, but these are enough to show how many ways there are of attaining the same end.

Now these might all be reduced to one which would be suitable for all circumstances, and there is no doubt that the most suitable form is quarter column.

Quarter column is the only formation that can be used on every occasion, and it has advantages over all others. In quarter column the whole battalion is under the eye, and within hearing of the voice of the Commanding Officer, and might almost be worked by signal from him.

In open column it is quite the reverse; the greater part is out of sight of, and beyond hearing any orders from, the Commanding Officer.

The same with all open formations. But to consider if quarter column is suitable for all circumstances : Take any example such as the before mentioned ; a regiment in line is required to move to another position, a mile to its left front, and with its new front about half left, moving, say, by oblique echelon.

To begin with, if there is any noise from firing, &c., the Commanding Officer's voice will not be heard by most of the battalion after starting. It may then be found that after going some way the nature of the ground necessitates some other formation, to attempt which creates confusion, and the men probably arrive in their new position in anything but good order.

Another way which is commonly used is by advancing from a flank in open column. This is at all times a difficult movement, from the fact that the leading companies generally outstrip the rear ones, and as a rule, especially on rough ground, have to mark time to let them up. There is also invariably a great deal of noise from the number of words of command each Captain has to give, and when in column the regiment may be said to be lost to the Commanding Officer, and to reform line obliquely from this formation is always more or less difficult, and tends to create confusion.

The same may be said of all other open formations, double columns, &c. They are all difficult to perform, and all of a more or less struggling nature.

Now take quarter column. The battalion is doubled into quarter column, on any company, with scarcely any noise.

The Commanding Officer takes his place close to the whole of his men, and marches them off at once, wheeling into the new alignment, and deploying without any confusion whatever, and the men arrive in their new position in good order.

A regiment in quarter column can move over any ground on which troops can manœuvre, and always keep its formation, which is another advantage, and if necessary to reduce its front, say in passing over a bridge, can do so at once by advancing in fours, reforming again on the other side.

In regard to time, also, it will probably be found that this method is in the end the quickest, as there is not likely to be any marking time or delay in taking up some other formation, which is generally the case with all others. This would be more likely to be the case on rough and unknown ground.

That formation must be the best by which movements can be done with the greatest ease and the least amount of confusion ; and if all movements can be done in one way over any sort of ground, it must be better than having a number of ways, which only make drill a difficulty instead of a simple matter, and the less there is to learn the more likely that it will be done well.

What advantage can there be from having so many formations in our drill ?

What is the use, for instance, of advancing or retiring in double fours from the centre ? It is seldom used, because double company columns

can only be used in open country, where there would be no necessity for reducing front.

What is the real use of double columns?

If it is possible to move in double column, it must be easier to move in single column, and single columns are much easier to manage than double columns.

It might be said that quarter column offers a better target than other formations, but at a distance the more troops are spread over the ground the more they would be likely to receive injury; whereas within striking distance troops would be always in fighting formation, except where they could find cover.

The Drill Book says that "columns in case of attack can readily be formed into line in any direction," but this is scarcely the case. It is very difficult to form either a column or double column suddenly into line in any oblique direction, whereas for quarter column nothing can be more simple. It is wheeled into the required alignment, and deployed.

The Drill Book also says that the employment of one form of column in preference to another depends on the ground, and can only be determined by the commander on the spot.

Now this is all very well on an open parade ground, but on unknown ground it is impossible to make sure of which is the best formation, but as the Drill Book also says "quarter column combines the convenience of moving in a small space, with the capability of forming in any manner to resist attack," and as to this may be added that it is suited to every sort of ground, it would appear that a commander would always be safe in using it, and, if so, what is the use of any other?

Now, supposing that the only intermediate formation was the quarter column, this would reduce drill in the field, *i.e.*, leaving out all connected with attack formation, route marching, &c., &c., to—

Line.—As the fighting formation (which would include echelon both direct and oblique, but only to be used as a line for purpose of advancing or retiring, not for intermediate formations).

Quarter column.—As the only intermediate formation (which would also include advancing or retiring in fours as a means of reducing front.)

Square.—As a fighting formation (column formations would be useful as at present, but only for purposes of parade, not for manœuvres, such as columns for forming up on parade, &c., &c.)

With these three, everything that can now be done could be more easily and better accomplished, and it would then be possible to do without a number of other formations, such as changing front, which is now done by a number of complicated and difficult ways, and which might all be done away with and reduced to the one, *viz.*, the quarter column.

Every one knows the difficulty, at present, of a line changing front by echelon, short echelon, &c., &c. Now take the one simple form—a line to change half left. Quarter column is formed at the double on left company or centre if required, wheeled up into the new alignment

and deployed at double ; all done without noise or confusion impossible to go wrong. Nothing for the Commanding Officer to think about as to which is the best way, &c., &c. And again it will probably be found in the end to be the quickest method.

Besides reducing the amount of drill as regards actual movements, this method would tend in other ways to simplify drill. For instance, guides and markers would be quite unnecessary, and thus one of the chief difficulties attending drill would be avoided.

Taking guides first. A guide has two duties to perform as such—to tend his company and to dress it in line.

As regards the former, it may be of some slight importance on show parades with some of the present movements, but would be little required under this arrangement ; and, as a matter of fact, men trained to march without a guide would soon learn to march better without than with them. At present every one knows that bad marching is more often the fault of the guide. For instance, a column starts off, the flank of direction is changed. The men, if left alone, having started off squarely, would most probably move straight to their front, but the guide doubles up on the flank, fails to get on the proper alignment, and puts out the whole company.

With regard to dressing a company, it is now allowed that it cannot be done when firing is going on, or quick work required, and bad dressing, like bad marching, is more often the fault of the guide, so why have it at all ?

A company when it wheels back into column from line is not dressed by a guide, and it may have been noticed that this is generally done better and quicker than dressing in line with a guide to help. With little practice, dressing can be done by the captain and section commanders from the rear, and with a major directing from one flank of line would be just as well done without guides.

For markers. Their duty is to take up points for the company. This also cannot be done when firing is going on or quick work wanted. A great deal of time spent over drill is devoted to teaching guides and markers, and how often it happens that movements have to be done over and over again so as to teach markers their work, and yet it is acknowledged that they are of no use, but time is spent over teaching them to show well at inspections. Very little practice would enable a regiment to work without them. If it is necessary to give a dismounted point, at any time, it does not require specially appointed men for the purpose ; any non-commissioned officer could be sent out. But the guides and markers have a really important duty, which is almost lost sight of. The men look on them merely as guides and markers, and, if asked who their section-commanders were, would probably be unable to say.

Section-commanders should have no other duty but to look after and command their sections. It is most important that they should know their men, and that their men should know them ; and when proving his company, the commander should call his section-commanders to the front to prove their own sections, so that all should know each other.

To simplify drill, besides reducing the various ways of doing the same thing to one, and giving up guides and markers, it would also add to the effect to reduce all words of command to as simple a form as possible, also not to break up companies, as in forming half companies and sections, not to perform any movement, or rather change of formation "on the march." These are much better done from the halt; the difference in time is very small, and taking into consideration that movements done from the halt are generally well done and easy to learn, and that on the march they are often badly done and difficult to learn, it will probably be found that a series of movements, done in the former manner, take shorter time than they would if done "on the march."

By going now through the first four parts of the Drill Book, we shall see how much unnecessary work can be saved.

PART I.

This being the setting up and training of the recruit, few changes are necessary; but some other exercises might be introduced, such as jumping, both high and wide, with arms and accoutrements, rushing short distances without losing order, &c., &c.

The only change in this part would be—

SECTION 33.—*Men marching as in file forming squad.*—There are six ways of doing this which might be reduced to two, *viz.*, Front and Rear Form Squad.

Part I.—Forming at the halt.

Part III.—Forming on the march.

Part V.—Forming to the right or left.

Part VI.—Forming to right or left about.

These are all of really very little use, and take a long time in learning. Part III—"on the march" is most difficult and useless. The one form, paras. 2 and 4—"Front and rear form," are sufficient, and for paras. 5 and 6—"Forming to right, or left, or about," it would be just as easy to wheel to the right or left, or about, and then form to the front.

The same remarks would apply to Sec. 44, paras. 3 and 4—"Forming in files"; also to Sec. 46, para. 2—"Forming in fours."

PART II.

GENERAL RULE VI.—*Officers of a company.*—The captain would command. The next four seniors will be section-commanders, or the subalterns might be half-company commanders, and the four senior sergeants, section-commanders.

GENERAL RULE XIII.—*Assembling on guides or markers.*—Part relating to guides and markers omitted.

SECTION 1.—*Formation of company.*—The captain would be three paces in rear of the centre. Senior subaltern in rear of right half company, junior subaltern in rear of left half company, four sergeants in rear of sections, or subalterns in rear of 1 and 4 sections, two sergeants in rear of 2 and 3 sections as section-commanders; and if company changes ranks, would still remain with their own sections.

SECTION 2.—*Company in line taking open order.*—Part relating to guides and markers omitted. Rear rank will dress by themselves, corrected, if necessary, from the rear.

SECTION 4.—*Wheeling into line.*—All relating to guides and markers omitted. The captain will judge when the wheel is completed, and halt his company, the same as when wheeling into column from line. There is no difficulty in this.

SECTION 5.—*Wheeling into column.*—In the same way all relating to guides and markers to be omitted.

SECTION 6.—*Changing front.*—To be omitted altogether.

SECTION 13.—*Marching in file forming to front or rear. Right, left, or about.*—The only form necessary is "Front and rear form," and not "at halt," or "on the march." To form to right or left, or about, wheel first, then form to front or rear.

SECTION 16, PARA. 2.—*Counter-marching "on the march" omitted.* Should only be done at "the halt." Counter-marching even at the halt is of little use, changing ranks being quite sufficient.

SECTION 20.—*Formation of half companies and sections.*—With the exception of what relates to forming square, half companies and sections should not be used for parade purposes. They are rarely even now used. A company, if possible, should never be broken up. If necessary, a half company or section may be detached under its commander, but this does not require any special instruction.

Even on the line of march, it would be better to have no other formations—than quarter columns of companies or "fours." Marching in half companies or sections is a most uncomfortable and tiring method. "Fours" is the favorite formation with the men, who can march with freedom, which they cannot get in any other; and any small advantage derived from these formations is more than counterbalanced by the men having to march in a cramped position. In fours there would not be the same necessity for defiling as it is with a larger front, so that the march in this formation is not likely to be interrupted or delayed.

SECTION 28.—*Inspecting and proving.*—Half companies and sections should not be named. Right, left, outer or inner. They should be numbered 1, 2, 3, 4, so that, when separated, they should always know what half company or section they are.

PART III.—BATTALION EXERCISE.

All relating to guides and markers should be omitted, but although markers be not used, yet it would be necessary occasionally to have dismounted points, either battalion or company, for instance, to mark a point for a battalion to march on, or for a company, as when companies form independently on parade, when each company would send a non-commissioned officer to mark the spot on which its flank would rest. When marching on any point, the flank section-commander would direct the pivot flank from their rear, the other companies being directed in the same manner on them under direction of the major superintending; but very little correction would be necessary when men are properly trained, and the company formed squarely to its front before starting.

SECTION 6.—*Dressing a battalion in line.*—This would be done without markers. If necessary, one or two dismounted points might go out with the major to get the alignment.

SECTION 10, PARA. 3.—*Column closing to the front without halting.*—Can never be required. Much better to do it always at halt.

SECTION 11, PARA. 3.—*Opening from the rear on the march.*—Omitted for same reason.

SECTION 12.—*Columns diminishing and increasing their front.*—Omitted as regards columns and double columns. For quarter columns, this should be done as at present, either by fours or breaking off files, or forming fours deep and closing.

SECTION 13, PARA. 2.—*Changing position by the flank march of fours.*—Omitted. Columns should not be used for internal movements of battalion drill.

SECTION 15.—*Counter-marching.*—Should only be done at "the halt," but of little use at any time; changing ranks quite sufficient, and much better.

SECTION 16.—*Changing the order of a column.*—Omitted. Of no use.

SECTION 19.—*Column moving to a flank opening or closing.*—Omitted. The only occasion on which this formation is necessary is when a line advances or retires in fours from right or left of companies, but should be looked upon merely as an advance or retirement of line, and to be reformed again into line. If necessary to form it into quarter column, it should be done at "the halt."

SECTION 21.—*Line wheeling into column.*—Omit all relating to guides.

SECTION 23.—*Advancing in column, column of double companies, or columns of half battalions.*—Omitted. Nothing but quarter columns to be used for battalion drills.

SECTION 24.—*Retiring from one flank in rear of the other.*—Omitted for same reason.

SECTION 25, PARAS. 1 & 2.—*Forming column from line.*—As regards column, omit all relating to guides and markers.

PARA. 3.—*Forming column of double companies.*—Omitted. Double company columns not to be used.

PARA. 4.—*Forming column from column of double companies.*—Omitted.

SECTION 26.—*Column wheeling into line.*—Omit all relating to guides and markers.

SECTION 26, PARA. 2, PART II.—*Quarter column wheeling into line from the rear.*—Omitted. Of no use. Much better and easier to wheel up and deploy.

SECTION 27.—*Column forming line to either flank.*—Omitted. Line formed only by deploying from quarter column.

SECTION 28.—*Columns of double companies forming line.*—Omitted.

SECTION 29, PARA. 3.—*Deploying on the march.*—Omitted. All movements to be done at the halt.

SECTION 30.—*Column of double companies deploying.*—Omitted. Double companies not used.

SECTION 31, PARA. 2.—*Moving to a flank in echelon by fours.*—Omitted. Not of the slightest use and very difficult, and likely to cause confusion.

SECTION 32.—*Line changing front.*—Omitted. All changes of front done by forming quarter column and wheeling into new alignment, and then deploying.

Note.—Echelons, both direct and oblique, are only to be looked upon as "Line," and merely for the purpose of advancing or retiring, and always to be reformed into line.

SECTION 34, PARAS. 1 & 2.—*Forming line from echelon.*—Omit all relating to guides and markers.

PARA. 5.—*Echelon forming line at right angles.*—Omitted. Should be done by means of quarter column.

SECTION 35.—*Echelon forming line in oblique direction.*—Omitted. Done by means of quarter column.

FORMATIONS TO RESIST CAVALRY.

Besides company and rallying squares and line formation to resist cavalry, we have three kinds of battalion squares, with five methods of forming them. These might be reduced to one, the four deep square, which is the only one of any use in the field.

SECTION 37.—*Battalion in line forming square*—Is a most difficult and useless formation, only applicable to purposes of parade, which could be met by forming three sides of a square by wheeling up flank companies.

SECTIONS 38 & 39.—*The different forms of squares.*—These might be reduced to one, four deep, and if possible keeping every company intact.

A two-deep square is of little use in the field. With company and rallying squares and line formation to resist cavalry, one battalion square, four deep, is sufficient.

PART IV.—BRIGADE EXERCISES.

The foregoing remarks applied to brigade exercise would result in a large reduction of unnecessary movements, everything being done as much as possible without dismounted points, which only cause delay, and bearing in mind that the only internal formation is the quarter column.

Everything on parade should be done as it would be in action. In the present drill, we take great pains to teach what is not likely ever to be used in the field.

SECTION 5.—*A brigade in line of quarter columns changing front.*—Although it would not be necessary to form in mass, as a battalion would form quarter column from line when changing front, yet it would be done, as then, by deployment only.

PARA. I.—*Changing front forward.*—Each battalion would wheel up till it was parallel to the new alignment. The base battalion would halt; the rest deploy into their new position.

PARA. II.—*Changing front by throwing back the whole on a flank.*—All the battalions, except the base one, will be turned to the right about, and will then wheel up parallel to the new alignment, the base battalion

wheeling at same time and halting on new front, the remaining battalions deploying.

PARA. III.—*Changing front on a central battalion.*—The above rules will apply.

SECTION 10.—*Advancing or retiring in line of quarter columns of double companies.*—Omitted. Double columns not to be used.

SECTION 11.—*Advancing in columns from flanks of battalions.*—Omitted. Only quarter columns to be used.

SECTION 12.—*Retiring in columns from one flank of battalions in rear of the other.*—Omitted.

SECTION 13.—*Double columns.*—Omitted.

SECTION 14.—*Double columns forming line.*—Omitted.

SECTION 15.—*Advancing or retiring in column.*—Omitted.

SECTION 16.—*A brigade in line changing front.*—Omitted. This is to be done by each battalion forming quarter column, wheeling into position parallel to new alignment, and deploying on base battalion.

SECTION 17.—*A line changing position.*—This would, in the same way, always be done by quarter columns, which can be moved over or round any ground on which troops can manœuvre.

Thus in the same way as in battalion exercise there would be—

Line.—Including line of quarter columns at any distance.

Mass.—Equivalent to quarter column of battalions.

Line.—As the fighting formation (including lines of quarter columns, and echelons of all kinds, to be used only for advancing or retiring.)

Mass.—For all distant changes of formation, and if a mass were to change direction by successive battalions in the same manner as companies of a battalion in column, line might be formed at any angle very quickly by deployment. Changes of front in lines of quarter columns would all be done by wheeling up or back all battalions parallel to the new alignment, then deploying on the named battalion. Changes of front in line would be done by forming quarter columns first, then wheeling parallel to new alignment.

EXTENDED ORDER.

There have been a number of different kinds of attack formations invented lately, as it seems to be acknowledged that our present one is not sufficient; but nothing seems to have met with general approval, and the probability is that an attack formation to give general satisfaction never can and never will be invented, for the simple reason that no one system can ever meet the requirements of all attacks.

No two attacks, even were they to be on the same ground, can ever be exactly the same, so how can any one system be invented which will suit all.

It is out of the question that what we now practise on parade would be used on every occasion of attack. In fact is it likely that it would ever be used against an enemy of a similar or greater strength than our own?

Let us first of all consider our system as it is.

It is supposed that a force has arrived in front of a position occupied by an enemy armed like ourselves with artillery, machine guns and rifles.

The commander decides on the point of attack, and we will now follow one of the attacking regiments.

Its formation is, as a rule, half companies of half of the number of companies in extended order as a fighting line, the unextended portion of these companies in support at about 180 paces, the remainder of the battalion as a main body 300 paces in rear.

They advance in this formation till within some 600 yards of the position, when the supports close up, and the fighting line halts at 100 or 150 yards off the position to be attacked, to allow the main body to close on it and make the assault.

Now the ground over which this advance takes place must either be open or broken. If the former, then the matter is settled, for not a man would likely ever reach within 150 yards, for it is simply impossible that such an advance could ever be made on open ground by day, against any enemy armed like ourselves, except in overwhelming numbers, when they would have to be prepared to suffer enormous losses.

If the ground is broken and uneven, they would have a better chance, but a poor one even then, unless good cover was afforded, in which case it would be much better to advance in one body instead of being broken up with the exception of some scouts ahead.

We are obliged to practise our system regimentally on open ground over which an attack never could be made to allow of the commander seeing everything that goes on, which he certainly never could do in a real attack. The first thing we teach is that the men must be very particular in not having more or less than three paces between each file, and also to go straight to their front. Now this can only be done on open ground, in fact on the only ground on which an attack is never likely to take place.

We call the extended portion the fighting line. It is no more the fighting line than the other portions. It seems a misnomer to call them supports, and main body, or reserve, considering the formation is only supposed to last for about 800 yards.

Then the companies are broken up. This must be bad at any time.

From the position of the so-called supports and main body, they and not the fighting line are the part of the battalion that will suffer heavy loss. Every shot that misses the fighting line is likely to tell either on the support or main body.

If complete cover is available, why break up the regiment at all? On arrival at position from which the assault is to be made, the fighting line halts till the rest come up, and how are they then formed? Anyhow. Fancy a captain, when he arrives at this point, expecting to lead his company to the attack, and finding them probably the rear rank to another company.

During the advance the fighting line keeps up a steady fire. Is this

good ? Is it not likely to do more harm to themselves than to the enemy ? At our field firing we have to be most careful that no accidents happen ; and it can only be done on open ground on that account. We do not mind blank firing on broken ground. It does not then matter if the men fire on each other.

What good does this firing do ? The enemy in position will not stand up in masses to be fired at. They are probably under cover. Even if some of them were exposed, is it likely that men in a breathless state will make good shooting ? So that actually there does not seem to be any good resulting from an attacking force firing.

There are other objections. First of all the advance must be greatly delayed and ammunition thrown away ; but the worst of it would be that the whole plan of attack is exposed to the enemy. Men advancing and taking advantage of cover will scarely be visible at 800 yards, or even 600, but one shot from a rifle shows where they are, and the consequence is that the enemy's fire and attention are directed to that part.

The great object of an attacking force must be to arrive at some part of the ground from which an assault could be made, if possible, without being seen, or at any rate attracting the attention of the enemy as little as possible, so that they may be taken unprepared, but firing has the effect of not only showing from what part the attack is to be made, but also of allowing them time to prepare for it.

Being probably under cover, and seeing that this fire had little or no effect, the enemy would only gain confidence.

Which is the most likely to succeed—an attack made in this manner, showing our hand to the enemy, and giving them time to prepare for it, or one delivered from some point to which the force had been brought up in perfect silence, and, if possible, concealed from view, at any rate until they got to within such a distance, as to allow of no time for the enemy to make any fresh dispositions ?

Is not a sudden attack more likely to shake and make unsteady defending force than one conducted in an open manner ?

Consider the difference. In one case, the defenders know exactly what is going on. How they are to expect and meet the attack. In the other, they are almost in ignorance of the movements of the enemy.

They do not know probably till the last moment from which direction the real attack is to be made. There is nothing more likely to shake the nerves of men than to fancy that something unforeseen is about to happen, and they don't know how to prepare for it.

Now let us consider an attack conducted in some different manner. As before, the attacking force arrives at a certain distance from the position to be attacked. Dispositions are made, and the commander selects a point on which the attack is to be made.

He also selects a position from which the attack is to be made and issues his orders to commanders.

A strong covering party might be sent on in front to take up some good position, from which heavy firing would be made to attract the attention of the enemy from the real attack. Under cover of this the attacking force would silently and rapidly take up their position for the

attack, advancing under cover as much as possible and not breaking up either regiments or companies.

The commanding officer informs his officers of the point they are all to make for, and sends off, say, two or three companies at a time, probably preceded by scouts.

Each captain exercises his own judgment in advancing his company. Suppose one had to cross some open country, he might have to advance all to one flank, or it might be necessary to advance man by man—anything so as to avoid being seen. Another might find his part broken ground, when he could advance his company in a body; but they would all take advantage of cover, waiting for each other, and arriving together at the appointed place, and if necessary supporting each other if attacked.

This would be done rapidly. Then other companies would advance at a convenient distance behind the first in a similar manner till all had arrived at the appointed place.

All this would easily be acquired by teaching, and men are more likely to take an interest in such work, and each individual would learn to use his common sense.

Regiments would thus arrive at the position from which the assault would be made with their companies unbroken, and the regiment would be reformed as it was previous to the advance.

This is of course only what might be done on certain ground. Every sort of ground will require its own form of attack, taking into consideration all circumstances regarding time, relative strength of opposing forces, position of enemy, &c., &c.

Regarding taking cover during an advance, some people are greatly against taking cover at all, on the ground that it is likely to cause the men to hang back.

This might be the case when firing was allowed, but when there is no firing the rapidity of the advance creates a large amount of excitement, which would prevent the men from thinking of anything but of getting to the position for which they are all making, and there is little doubt that by taking cover fewer casualties would occur, and it would be surely better to arrive at the attacking point with 80 per cent. of the original strength than with only 40 or 50 per cent.

Is an attack likely ever to be made under the present system?

Would a commander be likely to remember such a command as the following:—

"The battalion will extend for attack by sections—

No. will extend from ... ...
No. ,, ,, ...
No. ,, ,, ...
No. ,, ,, ...

and form their own supports."

Would company commanders like to see their companies broken up in all directions? One of our strong points is that our men are always so willing to follow their company officers, but how about a company that is turned into the rear rank of another, and probably some of its men with the other wing?

The probable fact would be that the system would be forgotten, and officers would do what is the most natural course, use their own judgment in making arrangements to suit the ground, and other circumstances, as might be the case at the time.

They would only suffer from the disadvantage that they had never, in time of peace, been able to practise all kinds of attacks under different imaginary circumstances.

Take a company advancing under the system, and having to pass through some thick scrub. If the captain stuck to the system, he would caution the men about keeping their four paces distance, but the most natural course would be to point out some object on the far side to make for, section-commanders keeping their sections well in hand. We teach our men only how to advance in order, but they also ought to be taught how to advance in disorder, re-forming again into order—in fact to teach officers and men how they should act under all circumstances.

If an officer on service were to think only of what he had read in the Drill Book, or what he now learns on parade, instead of using his common sense, he would very soon find himself in a bad way.

It would probably be found much better instead of having one system only to have certain rules to be observed and leaving all to the commanders of regiments. They would receive their orders and carry them out in the best way they could, but this can only be done by practising in peace time on every sort of ground and under all kinds of imaginary circumstances. Only experience can teach this. Rules might be something as follows :—

1. Companies never to be broken up, and always to work under their own officers and section-commanders.
2. Attacks never to be practised on open ground, or on such ground where a real attack would not be attempted.
3. It should always be supposed that the enemy is at least equal in all respects to the attacking force.
4. No firing to be made by the assaulting force during the advance, unless attacked.
5. All cover to be taken advantage of, even if it be only a few blades of grass.
6. No words of command necessary, merely instructions issued from the commander to his officers who carry them out.
7. Companies to be led into position for attack by their commanders, who will select the best line for moving, and the most suitable formation, giving all assistance necessary to other companies.
8. Men always to wear their oldest uniform or, if possible, service kit.

For this no form of drill would be required, and it would only be necessary to have constant practice at such work, as would be likely to occur on service.

So that in the Field Exercise Book in Part I, rules regarding extended order, so far as they relate to the attack formation, might disappear.

The same in Parts II, III and V, which would reduce bookwork by a large amount.

Skirmishing would still be as necessary as ever, both for covering an advance or retirement, as well as for engagements in the field.

With regard to having no firing on the advance, this, of course, only applies to the disposition for an attack. It might be necessary to have firing, say, in the event of a counter-attack, &c. At the same time firing should never be allowed by men when moving. It can be of no use, except to make a noise. Men should never be allowed to fire till they are steady enough to take aim.

The front rank of a line advancing preparatory to charging might fire volleys from the hip without halting.

These few rough remarks on drill are made with the purpose of trying to show how much there is in our present drill which might safely be done away with, retaining all that is useful for real service, with what is required for show, such as "marching past," "review order," &c., &c.

In former days officers and men had little to do except on parade; consequently a great deal of time could be devoted to it; now it is very much the reverse.

Important work has to be neglected for drill, so that a regiment should make a good show at inspection.

If a number of useless movements were done away with, it would still be the case that regiments make as good a show as ever, while being able to spare more time for other useful subjects.

There is no doubt that drill is still very difficult, requiring a large amount of study and practice to prepare officers to appear always as "good drills," but the greater amount of what is learnt is of little or no real use.

Under some such arrangement as here proposed drill, instead of being a puzzle to many, would be simple for all, and it would only require good "drilling," that is Recruit and Company Drill, to make a regiment always fit either for show or for work in the field.

BERNARDMYO, *8th September*, 1887.

THE ISSUE OF "FIRST RESERVE" AMMUNITION TO INFANTRY ON THE OFFENSIVE IN THE FIELD.

(In accordance with modern requirements and how it can be carried by the soldier.)

By Major F. G. A. Wiehe, *Durham L.I., D.A.A.G. for Musketry, 2nd Circle.*

1. When on the offensive a plentiful supply of ammunition throughout the attack, to meet a counter-attack, after a successful assault, or retirement in case of a repulse, is absolutely necessary. Given the transport, it is easy enough to have ample reserve ammunition in the field, but its *issue* so as to ensure to the troops engaged during an offensive action—the possession at all times of an ample supply—is a most difficult and important matter, and deserving of serious attention. A scarcity of ammunition at the critical stage or stages of an action in these days of rapid firing arms of precision would entail certain temporary defeat, or may be disaster.

On the defensive, the supply and issue is a matter of comparative simplicity. Therefore it is only with the *issue* of reserve ammunition in the field to *infantry* troops on the *offensive* that I propose now to deal.

2. In these days of rapid firing, and especially if "long range fire" is carried out, the expenditure of ammunition is vastly increased, and the difficulty of supply and issue proportionally enhanced.

It would, therefore, seem somewhat strange that on a matter of such vital importance the regulations of the service afford such meagre information for guidance disposing, as they do, of the subject in *a few lines* of vague meaning, leaving so much in the matter of its execution to the discretion and opinions of individual general and regimental officers. Of course, no hard and fast *rules* to meet the variable conditions of service could be laid down, but I think some clear and definite *guiding principles*, based on the well-known destructive powers, and the tactical employment of modern rifles which have exercised such a reforming influence on the tactics of modern *European* warfare, might be framed and published.

3. Why is it that such has not been done long ago, and what is the reason of our prolonged apathetic neglect of the matter? I venture to suggest this as an explanation that, owing to our insular position and our Imperial interests, continually involving us in petty wars, mostly with an ill-armed and ill-disciplined enemy with almost invariable success, we are content to remain conservatively satisfied, blinding ourselves to the great strides in practical efficiency being

made by Continental powers, who find it necessary to keep pace in all respects with the ever-increasing demands of military service.

In other words, we lack practical experience obtained on a modern European battle-field, and we have not made up for the deficiency by profiting in this matter by the experience of other European powers.

4. Let us briefly consider what their systems are.

According to Mayne's "Fire Tactics," published in 1885, the systems then in vogue for issue of ammunition to firing line in the field were as given below, but it is not improbable that later improvements of a practical nature have been introduced.

It is somewhat consoling to find that Russia and France are little, if anything, in advance of ourselves, as their wagons, and men with bags, follow the firing line to the *last*. But Germany and Austria issue 20 and 12 rounds respectively before extending for attack. They also recognize that men-carriers are not efficacious for keeping up a proper supply, and substitute horse agency. Moreover, if ground is open, they do not send them further than the "supports," who carry forward the supply for "firing line," or in any case only issue up to the *beginning* of the *last* or *critical* stage. They have therefore made sound practical improvements in their system, appreciating its vital importance.

It is possible that at some time British and Native troops may have to meet a European foe armed probably with Magazine rifles. Does it not then behove us, with our comparatively miniature army, our somewhat slower firing breechloaders, and our notorious inefficiency in "musketry fire tactics," to counteract the odds against us by having perfect arrangements for the continuous supply of ammunition to our troops during an action? Otherwise, it is surely not unreasonable to predict that we may discover our faults too late, and buy a painful experience most dearly. May such a fate never overtake us! But rather let us, while there is time, profit by practical experience, either our own or that of other nations, and make good defects in our system (provided, in the opinion of men better qualified to judge than I am, defects *do* exist), and not shut our eyes blindly to their existence, resting satisfied under a false sense of security and efficiency, which may not inaptly be compared to the fallacious tactics indulged in by the ostrich, when pursued, which furnishes a moral we might well profit by.

5. Let us now consider what the regulations on the subject are.

In the "Field Exercise," page 220, para. 8, it says: "The regimental ammunition reserve will follow the main body at a distance of about 20 yards, until it *approaches* the *fighting line*, when it will be posted under cover in some convenient spot for the ready supply of ammunition *to the fighting line*; the pioneers will accompany it. Previous to an advance, each company of the fighting line should have reserve ammunition distributed, a portion of which may accompany the supports." (The italics are mine.)

Now this seems to me extremely vague and open to several interpretations.

I understand it to mean that the first reserve would follow

"main body," *throughout the action*, until it gets close to the "fighting line," when it would be placed under cover in a suitable position, ready to issue ammunition as required, *under a hot fire*, at short ranges. The next few lines I fail to understand, but it may mean that, previous to extending, the "fighting line" should have some reserve ammunition (but how much?) issued, and a portion of such issue (or is it of first reserve?) may be carried by the supports (or accompany supports instead of the main body).

Again at page 231 it says: "Serving out ammunition from the regimental reserve must be carefully and frequently practised."

These are the only references to the subject contained in the book. It is possible, though not probable, that more detailed instructions have been issued in England on the subject, from the Horse Guards, that I am not aware of; but it is most unlikely, as, if so, such orders would in all probability have been promulgated to the army at large. The matter would, therefore, appear to be thus briefly disposed of.

In India the matter has been somewhat more fully considered and dealt with in the following circular memoranda: "A. G.'s" No. 249E., dated 27th October, 1883, submitting proposals by two Commanding Officers for the management of regimental reserve ammunition. The issue by one was advocated before and during the action as required (by men with canvas bags); by the other apparently in the same manner, but if issue required "exceptionally" during the action, he proposes its being carried by "supports" and "main body" to hand over on reinforcement, and this plan seems to be preferable.

These proposals were sent for trial and report by General Officers Commanding.

The next was "A. G.'s" No. 2401E., dated 9th October, 1884, giving details as to procedure of Pioneers, or N. C. officer in charge of company mules, when signalled to for ammunition.

This clearly implies they are to risk exposure and take mules right up to "fighting line," *during the action, cover or no cover*—canvas bags to be used only in places inaccessible to mules.

This permits great latitude to Commanding Officers, and hardly impresses upon them the necessity of not keeping the ammunition, mules, and men exposed to fire.

The consequences of this, combined, perhaps, with insufficiently practising the issue of ammunition on regimental and brigade parades, were recently demonstrated in a practical manner at the Delhi Camp of Exercise, and did not escape the notice and unfavorable criticism of the foreign officers present.

During the field operations, serious defects in the issue of regimental reserve ammunition,—failure only too often of officers to grasp the importance of keeping mules under cover, and to profitably exercise their discretion in the efficient issue of ammunition,—were brought prominently to light, and were commented on somewhat strongly by H. E. the Commander-in-Chief, in "A. G.'s" Circular Memorandum No. 756E., dated 3rd June, 1886.

A consideration of the gist of the regulations and orders on the

subject, as enumerated above, will, I think, be admitted as supporting my contention already expressed, as to a want of definite instructions and guiding principles.

6. I will now proceed to offer my suggestions towards a solution of the subject under consideration.

First of all I will state the principles which constitute the basis on which my proposals will be framed.

1st.—That, owing to the deadly efficacy of modern fire in open or slightly broken ground, all first reserve ammunition should be issued before the troops extend for attack to save mules and men from unnecessary exposure to fire. If the nature of the ground affords ample cover at intervals in the advance, such issue, to save fatigue of the men engaged, might be postponed as an *exceptional* case (to be decided on the spot), but always in the case of "fighting line" the issue should be made previous to their arrival within the effective fire zone, or say at 600 yards from the position, and in the case of "supports" and "main body," previous to their reinforcing.

2nd.—That *special* ammunition be carried for *long range fire*, to make good the amount expended before advancing. That all "long range fire" be carried out by men (at least a double company) detached from main body, placed on a flank, or other favorable position, to assist in the "preparation," and cover the advance of the "fighting line," to the attack, who by this means enter into action fresh for work, with shoulders uninjured and better able to carry on an effective fire from first to last.

3rd.—That the mules, men and first reserve ammunition be told off to *each company* (or double company, if transport is scarce), and kept distinct, so as to be always ready to accompany it, the only exception being previous to extension for attack by half-companies,* when part of the main body, ammunition and mules will be temporarily transferred and attached to the "fighting line" and "supports" as will be hereafter explained.

4th.—That 70 to 90 rounds per man should be in possession at commencement of final or critical stage, *i.e.*, from 400 to 500 yards of position, after absorption of supports and main body into firing line.

5th.—That the distribution should be proportional to the time, each portion of the battalion is likely to be engaged, but not exceeding in *the aggregate* the authorised battalion allowance of 30 (or more) rounds per man. If not all issued to the fighting line with a view to save them unnecessary fatigue, the balance would be carried and handed over by supports on reinforcing. The main body on reinforcing might, in case of emergency, hand over one or two packets to fighting line and supports from their own ample supply.

6th.—That in order to be able to *carry into action* the greatly increased number of rounds modern requirements necessitate, the soldier, *previous* to an *offensive* engagement, should be relieved of all articles of kit not absolutely necessary for the time being to be carried under regimental arrangements. The weight of kit thus removed can, if it is

* If by one section of each company, no such transfer is necessary.

considered that much opposition and stubborn resistance will probably be encountered, be replaced by extra ammunition. Ample food for *body* and *rifle* should be considered as primarily essential to success.

7th.—That as soon as *first reserve* supply has been issued, immediate steps be taken to replenish from the *second reserve*, and to place the mules, etc., in a safe position, but one convenient for the ready further issue of ammunition, if required on an emergency.

I propose to distribute the ammunition in the following proportions: For a battalion 800 strong, each man having in possession 80 rounds, carried in two pouches of new valise equipment. (If required, 100 rounds in 10 packets can be so carried.)

("A") Fighting Line ... 80 + 50 = 130
Supports ... 80 + 30 = 110
Reserve ... 80 + 20 = 100

This to be issued *before extending* or advancing to the attack, as follows:—

("B")

Distribution.	Fighting Line.	Supports.	Reserve.	Long Range Fire.	Remarks.
In possession ...	80	80	80	10 or more per man available from "*Special Reserve.*"	Previous to advance, 30 rounds will be *opened out*, and placed in bandolier or belt pouch (described hereafter) so as to be *easily available* for *quick loading.* Supports on reinforcing hand over 10 rounds to fighting line. *In case of emergency only*, the reserve on reinforcing might spare 10 rounds each to old fighting line and supports.
Previous to advance	40	30 *10	20		
From Supports ...	10*				
,, Reserve ...	+x	+x	−x	Amount expended to be made good therefrom.	
Total ...	130 +x	110 +x	100 −x		

The above distribution is at the rate of 30 rounds per man, thus:—

		Men.	1st Reserve.		Total.	
("C") Fighting Line	4 half-companies / 8 sections	200	× 50	=	10,000	
Supports ...	Ditto ...	200	× 30	=	6,000	
Main Body	4 companies / 8 half-companies	400	× 20	=	8,000	
	Grand Total ...	800			24,000	$\frac{24,000}{8}$ = 30

("D") Special Reserve Long Range Fire } 4 companies, 400 × { 10 or 20 } = 4,000 / 8,000 rounds.

The above would require ... C—41⅔ boxes = 20⅚ mules.
(or double) ... D— 6⅔ " = 3⅓ "

Total ... 48⅓ " 24⅙ "

Each company of 100 at 30 rounds would require 3,000 rounds, 5 boxes, 2½ mules, or a grand total for "C" at the rate of 3 per company of 24 mules, exclusive of "D."

But if transport is scarce, the requirements of each "*double company*" would be 10 boxes, 5 mules, or a grand total for "C" of 40 boxes, 20 mules, exclusive of Special Reserve "D" of { 6 or 12 } boxes, { 3 or 6 } mules, per battalion.

It will be observed that, in order to simplify the issue and avoid possible confusion, due to necessity of making calculations, the above totals of 50 and 30 rounds issued to fighting line and supports respectively, are at first issued by giving 40 to each, so that if extension is by *half-companies*, 10 rounds to each are only required from *main body* reserve in addition to their own 30 rounds. [See also foot note, para. 6 (3rd.)]

Thus each company or double company would have its 3 or 5 mules, in charge of a Pioneer, carrying 30 rounds per man, with pick and shovel ready to accompany it anywhere, and in addition there would be the 3 or 6 mules for conveyance of special reserve, as abovementioned. Each mule should have a tin ticket with letter of company, etc., impressed thereon, and attached to the head stall or bridle.

8. In case of a battalion being ordered to assume the *offensive* in attack formation, the procedure would be somewhat as follows :—

On the battalion of 8 companies being told off for attack (to extend by half or quarter companies), intimation in writing, stating companies told off, in what manner and approximate strength, would at once be sent to the officer in charge of *first reserve* ammunition, who would on receipt thereof send the mules and ammunition to their companies. But, if directed to extend by *half-companies*, he would in addition tell off mules and ammunition at the rate of 10 rounds per man, from the companies of "*main body*," and temporarily transfer them to companies detailed as *fighting line*, and *supports*, which would then make the primary distribution as follows :—

Fighting Line	40
Supports	40
Main Body	20

which would be at once issued and disposed of as stated in Table "A" by 2 men per company with canvas bags (who would remain with the mules throughout), assisted by supernumerary rank.

If *long range fire* is to prepare the advance, the companies detached from the *main body* would at once be moved off to the position selected,

after opening out 30 rounds. At the conclusion of the firing, they would rejoin the *main body*, when the ammunition expended would be made good to them from the "*special reserve*" up to 80 rounds per man, and the *first reserve* of 20 rounds per man would be also issued.

9. As an extra precaution, to avoid any chance of confusion previous to sending the mules to the battalion, special labels of different colors, with abbreviated words or letters, signifying "Fighting Line," "Supports" and "Main Body," painted thereon, should be issued by officer in charge, to be fastened to the mules as told off by him, and *returned* when issue has been made. The 2 men per company should also have above labels issued to them, to be returned as above, and in addition should be provided with a small company distinguishing flag, about 18 inches square on a bamboo stick, one similar to which would be with each company.

10. The *first reserve* mules would be sent to the *second reserve* to replenish as soon as boxes are empty.

If more ammunition should be required it would be signalled for, the officer in charge, after replenishing, having taken up a sheltered, central position, if possible, so as to be near at hand, and the issue would be by companies in such manner as circumstances rendered expedient.

11. By this arrangement, the mules and men would actually belong to their respective companies or double-companies throughout (the transfer of 10 rounds per man from *main body*, in the case of the extension for *fighting line* by *half-companies*, being only temporary, so far as mules are concerned), and there should be no confusion.

12. The following are some of the advantages claimed for this system of issue :—

The 30 (or more) rounds per man per company are carried on the march, etc., intact. If increased to 50 rounds per man, the extra 20 rounds would be issued in addition and carried in the havresack, and the above distribution would not be in any way affected, merely entailing more mules and boxes per company. The men advance into action with that confidence, inspired by having in possession an ample supply of ammunition, and are, if necessary, relieved of all superfluous kit to save fatigue. The mules and carriers are not exposed to certain danger and risk of life. The whole should work perfectly smoothly. The long range ammunition is separately provided for, which seems absolutely necessary. At the critical stage each man would probably have 80 or 90 rounds in possession, and if the ammunition of the wounded and killed were utilised, still more, and thus there should be ample to meet all requirements and contingencies.

13. Captain Faithfull, D.A.A.G. for Musketry, in a paper on the subject,* advocates a plan, the principles of which are very similar to mine, but his details for carrying out the issue differ in the following respects :—

(*a*) The amount for each *company or double company* is apparently not kept intact, at 30 or more rounds per man, which would lead to complications.

(*b*). The primary proportional issue to *fighting line* and *supports* are not the same, thus less simple.

* Journal of U. S. I. of India, 1887, Vol. XV, No. 67, page 171.

(*c*). His fighting line at first carry 10 rounds more, or an extra 1lb weight, which my *supports* carry up.

(*d*). I start with my reserve at 30 rounds per man, against his at 50 per man, entailing extra carriage. The only difference in total rounds eventually proportionately issued is that only his *main body* get 10 rounds more per man, which is hardly necessary.

(*e*). His *main body* brings up 20 rounds for *fighting line* and *supports* on reinforcing. This amounts to 8,000 rounds. Owing to casualties in the advance up to within effective fire zone, much ammunition would never reach the firing line. I prefer that the *supports* bring up a packet or more for each man in *fighting line* (or 2,000 rounds), and the *main body*, in case of *emergency only*, might transfer one or two packets from *their own* supply to firing line.

(*f*). I provide a *special reserve* for "long range fire," which is kept quite distinct.

14. I will now consider how the above-mentioned ammunition can best be carried, and will assume that the men are provided with the new valise equipment for British troops. There are two buff pouches, carried on the belt, made to carry four packets each, or 40 rounds, but five packets might be carried if required, making a total of 80 or 100 rounds. Any extra rounds issued in packets to be carried in havresack, and open rounds as hereafter provided for. The present pouch is quite unsuited for carrying loose rounds as well as packets, and when men are in the "lying down" position, the loose rounds fall out. I would therefore strongly advocate that these two pouches be used solely for *packets* and be called *reserve* pouches, while an extra *field expense* pouch, to hold 20 rounds, be authorised somewhat of the following description :—

A long pouch of brown leather, to fasten on to waist belt and sit comfortably at right side, to hold two rows of ten rounds abreast, placed in separate partitions, just the size of a cartridge, so as to fit tightly; the base to protrude about half an inch so as to be easily grasped when loading; a flap of leather from one end to the other over top, to be fastened to a metal button at either end, when not required for loading, and to ensure safety of cartridges when on the move.

Over left breast, ten or more rounds to be carried in closely-fitting partitions, either of same material as *khakee* coat, or of leather, on a base of thin leather, to be fastened by button to coat and detachable at will. The right breast to be free from pocket and cartridges, so as not to interfere with the rifle when quickly brought to "*present*." On left side, below cartridges, there should be a large pocket with flap, and button fastening.

The above plan would enable men to load rapidly in all positions, and during a pause expended cartridges can be replaced by one or more *packets* at a time, and it obviates the objection to pressure across the chest, which a bandolier or chest-belt entails.

I have thus provided for the efficient conveyance by the soldiers of 110 or 130 rounds or more, all securely placed and easily got at when required.

15. I will now detail the articles of a British soldier's equipment in the field, their weight, and how this can best be reduced with a view to relieving him of as much unnecessary weight as possible, thus enabling him to carry a large number of rounds without undue fatigue :—

Full Field Kit.

	lb.	*oz.*	*lb.*	*oz.*
Great Coat and Cape	5	8		
Canteen and Cover	1	10		
Valise, full	7	12		
			14	14
Rifle	8	12		
Bayonet	0	15		
			9	11
Belt, two pouches, frog and scabbard	2	12		
Sling	0	4		
Other straps	1	2		
			4	2
Water Bottle, filled	2	10		
Havresack	0	9		
Eighty rounds of ammunition ...	9	0		
			12	3
Gives a total weight of ...			40	14

The following articles of kit *not being absolutely* required could be left behind previous to departure on service :—

1 Holdall.
1 Spoon.
1 Razor.
1 Shaving Brush.
1 Sponge.
1 Pair of Mitts, according to climate.

} Weight 13½*oz.*

The following also in addition to above, in *case of emergency*, might be left with regimental baggage for a period of *one or two days*, while in contact with the enemy :—

	lb.	*oz.*
1 Shirt ... } 1 Pair of Socks ... }	1	8
1 Button, Brass		
1 Tin Blacking (dubbing being applied) ...		
1 Piece of Pipe Clay	4	3¼
1 Set of Brushes		
1 Valise (as no ammunition is carried in it)...		
Total ...	5	11¼

A grand total of 6lbs. 8¾ozs., or the equivalent of about 60 rounds of ammunition, all, or part of which if necessity arose, might be issued either on the eve of an expected engagement, and carried on the march, or on going into action, without over-taxing the soldier's strength. This, together with 30 rounds, first reserve, issued before extending for attack, would bring total ammunition in possession to 170 rounds per man, of which the Fighting Line would get 190 altogether.

Supports ,, 170 ,,
Main Body ,, 160 ,,

16. The remaining kit considered "*absolutely necessary*" would be as follows :—

		lbs.	*oz.*
Great Coat and Cape	strapped to Dees at back of belt	5	8
Canteen strapped to belt.			
Glengarry Cap, Towel and Soaps, Knife and Fork, Comb, Oil Bottle.	In havresack in addition to two days' cooked rations, or wrapped in towel and put inside coat, leaving havresack free for ammunition and food.	2	13½
	Total	8	5½
Add 140 rounds of ammunition, rifle, &c.		32	12
		41	1½

without food.

17. The weight carried by the sepoy in the field, including great coat, rifle, &c., and 80 rounds of ammunition (which are carried in two pouches in the new Mackenzie equipment, instead of 70 in two pouches and one bag) amounts only to about 32lbs. So that in case of urgent necessity, he could carry extra rounds. But by leaving great coat and cape in regimental charge previous to going into action, he might carry 60 rounds extra without the addition of any weight. This would be a total of 130 or 140 rounds, which should be ample, and would be distributed proportionately as laid down for British troops. Thirty first reserve and 30 extra from second reserve and carried thus : in two pouches 40, loose in expense bag 20, and over left breast 10, in havresack 60. But a quick loading field expense pouch, as already described, would be a desirable addition to their field equipment, and would reduce amount to be carried in havresack to 40.

18. In conclusion I would merely remark that I trust I have described, perhaps not very clearly but to the best of my ability, how first reserve ammunition can be effectively issued so as to ensure the minimum of exposure and danger to the party, and in such quantities as will satisfy the increased requirements of modern warfare, and how such can be carried without entailing undue fatigue on the soldier, so that he may arrive at the critical stage of the attack full of energy and fight with his pouches full.

JAPAN.

By Captain H. B. Urmston, *6th Punjab Infantry.*

These articles are an amplification of the lecture delivered before the United Service Institution at Simla on the 5th August, 1887.

(*Continued from p. 235.*)

THIRD PERIOD OF HISTORY. A.D. 1199—1334.

From Yoritomo to the Ashikaga Dynasty.

Hojo Supremacy.—The third period of Japanese history commences with the growing feebleness of Yoritomo's Minamoto successors, so that the era came to be called that of the Shadow or Puppet Shoguns. Tokimasa of the Hojo family, like his predecessors among the Fujiwaras and Tairas, from being a Councillor gradually came to hold the supreme power under the title of Shikken or Regent. The Hojos were related to the Tairas, and like them traced their descent from Kuwammo Tenno, 50th Mikado. Hojo was the name of their ancestral home in Idzu. The Japanese looking back to the tyranny of the twelve successive Hojo Shikkens, who virtually ruled the country from A.D. 1202 to 1334, have pronounced on their tyrannical despotism a verdict even more unfavorable than that on the Tairas. The Shoguns meanwhile succeeded one another in accordance with Yoritomo's requirement from the Minamoto family. Two Fujiwaras and six imperial princes actually became Shoguns in succession to the three Minamotos, but every one of these eight took the name of Minamoto to fulfil the required conditions.

But the Hojo Shikkens who had aspired to the *rôle*, previously played in turn by Fujiwara and Taira to the Mikado at Kioto, undertook the same in regard to Yoritomo's successors at Kamakura.

Marco Polo.—The most noteworthy events of this period were the introduction of Japan to Europe by the Venetian Marco Polo in A.D. 1298.

That traveller had spent seventeen years (1275-1292) at the Court of the Mongol Emperor Kublai Khan at Pekin or in Manchuria, and had there heard of the island kingdom called Zipangu or Jipangu.

Mongol Armada.—It was at this time that Kublai Khan, having overthrown the Sung Dynasty and conquered the adjacent countries to the eastern coasts of China, sent ambassadors through the Koreans to demand tribute and homage of Japan, things to which Japan had not been accustomed. The Hojo Tokimasa enraged at their insolent demands dismissed them in disgrace. According to one account six ambassadors were sent, and six times they were rejected. Upon this Kublai Khan sent an

expedition from Corea of 450 junks with ten thousand men, who landed at Tsushima and Iki. They were bravely attacked and their commander slain. All Kiushiu had been raised to arms. The expedition returned having accomplished nothing, A.D. 1275.

Some historians attribute to the presence of Marco Polo at Kublai Khan's Court—that monarch's first information of Japan and his desire to profit by its riches.

According to another account Kublai Khan's ambassadors, sent in 1275 and 1279, were brought before the Shikken at Kamakasa and decapitated, whereupon Kublai Khan sent an armada of several thousand junks containing 100,000 men, of whom 10,000 were Koreans, sailed towards Takashima.

The fighting which took place from the shore where the Japanese felt their strength to lie, the individual deeds of prowess performed by the few against the many, the rousing of the nation to arms, and the final and complete destruction of the armada by the aid of a fearful typhoon which assisted the Japanese in their pursuit of the enemy as they fled in their junks, are graphically narrated by Griffis. Only three men are said to have escaped. This is the only record of an attempted invasion of Japan, and bears strong points of resemblance to the fate of the Spanish armada against our own islands three centuries later, *viz.*, in 1588.

On Sanetomo, Yoritomo's second son, being killed by his nephew in revenge for the supposed murder of his father Yoriiya, Sanetomo's elder brother, the main line of the Minamotos came to an end, 1219 A.D. During the period of anarchy and civil war of the 14th century between the northern Emperor Ashikaga on the one hand and Go Daigo on the other, Yoshisada, a descendant of the Minamoto, attacked and destroyed Kamakura, and then in 1333 the sole rule of the Hojos terminated, and in 1338 the family had well nigh disappeared.

The latter days of the Hojo present a disgraceful spectacle of tyranny and misgovernment, Mikado, Shogun and people alike being victims to their oppression.

The attempt by the Mikado Go-toba had failed. In 1327 Moriyoshi, son of the Mikado Go Daigo, and Kusonoki Masashige, attempted to restore the Mikadoate,

Their attempts were once more unsuccessful. Go Daigo was himself untouched, but Kusonoki escaped and lived to win immortal fame,

Nitta Yoshisada.—At this time there arose another great commander and hero, Nitta Yoshisada, taking his name of Ashikaga from a fief held by the family in Shimotsuke. He became the founder of the Ashikaga house. At first a Hojo captain he deserted with his command rather than fight against the Imperial forces, and turned his troops against the Hojo troops at Kamakura itself, attacking that city on three sides, A.D. 1333. On the eve of battle, in the presence of his troops, he flung his sword into the waves, and laying before the gods his intention to regain for the Mikado his sovereignty, he prayed them to open for him a way in token of their favor. The tide ebbed and allowing his army to pass through gave spirit to his troops.

The fighting was severe and bloody, but victory finally rested on Yoshisada, who, after performing great feats of personal valour, reduced Kamakura to ashes. Meanwhile his relative Ashikaga Takauji had also gone to the Imperial Court at Kioto, and with the hero Kusonoki drew the sword at the capital and re-established imperial rule in the West. Six thousand eight hundred Hojo and heroes were slain or committed *harakiri*. The people all over the empire rose against their late oppressors and massacred them. The Hojo power after a rule of one hundred and fifty years was utterly broken.

FOURTH PERIOD. A. D. 1333-1573.

The Ashikaga Shogunate, from the fall of the Hojos to the accession of Nobunaga.

The Mikado Go Daigo, 96th Mikado, was recalled from the banishment to which the Hojos had consigned him; and the rival puppet, Kogen, whom they had set up, had retired into obscurity.

However Ashikaga Takauji, Yoshisada's relative, who had been sent by Go Daigo to suppress insurrection at Kamakura, delivered the population from the tyranny of Moryoshi, and proclaimed himself Shogun. It was not till 1338 however that the Mikado recognised him by that title. The faithlessness of Takauji had disgusted his Ashikaga relative Yoshisada, and Yoshisada was now sent by Go Daigo to chastise Takauji. Takauji, however, defeated them near Takenoshita in the Kuanto, and led his army to Kioto against the Mikado, who was once more obliged to flee and find refuge in Müdco.

At this juncture many of the Mikado's old and loyal supporters, including the brave and honorable Kusonoki Masashige, renewing their previous alliance with Nitta Yoshisada, suddenly attacked Takauji at Kioto and made him fly to his head-quarters at Hiogo. Once more the Mikado was conducted back in triumph. Once more Kusonoki Masashige was sent against the Ashikaga Takauji; but his plans were rejected and advice ignored. Obliged however to fight he was totally defeated, and committed *harakiri* at the age 43.

Of all the characters in Japanese history that of Kusonoki Masashige stands pre-eminent for pureness of patriotism, unselfishness of devotion and calmness of courage. When interrogated as to whom they consider the noblest character in their history, the unanimous answer is Kusonoki Masashige. Every relic of this brave man is treasured up with religious care, and fans inscribed with poems written by him in *fac simile* of his handwriting are sold in the shops and read by those who love to imitate his exalted patriotism.

Again Go Daigo Tenno left Kioto for refuge, and Takauji returned. He was yet a rebel, and his undertakings were unsanctioned. He consequently set up a new "Son of Heaven," Komio Tenno, or Kogen, as Mikado. The new Mikado forthwith nominated Takauji Ashikaga as Sei-i-taiu-Shogun at Kamakura, 1336.

Meanwhile Nitta Yoshisada had continued to sustain the cause of Go Daigo Tenno, but was killed in a reconnaissance near Fuchin, the capital of Echizen, where three thousand of the enemy fell upon him, A.D.

1338. Disdaining to fly he turned his horse against the enemy, and defended himself till his horse was struck down and his eye pierced with an arrow. Thereupon he drew out the arrow and with his sword struck off his own head.

Nitta Yoshisada was only 38 when he died. His heroism, chivalry and devotion to the loyal cause have secured him by the side of Yoshitsune and Kusonoki Masashige a foremost place among the heroes of mediæval Japan.

Go Daigo died in 1339, Ashikaga Takauji in 1357. The prestige of the Southern dynasty dwindled with the death of the chief supporters.

In 1392, however, when its prospects seemed at their worst, peacew as proposed by the Ashikaga, and the Southern Emperor was persuaded to proceed to Kioto and make over the regalia to Komatsu, who henceforward was regarded as sole and 99th Mikado, dating from 1392—1412. With this event the country began to enjoy a brief period of rest. Thirteen Shoguns of the Ashikaga family ruled from this time to 1573 A.D. It is described by historians however as a period of confused civil war.

The history of Japan cannot show a period of greater political confusion, of greater barbarism, or of misery than at this time.

Suddenly a ray of light fell upon the land from the distant west.

Marco Polo.—Marco Polo had heard of Japan, as has before been noted, in the years 1275—1292 at the Court of Kublai Khan and published his book in 1298. Columbus had studied this book, and the American historian declares his desire was not to discover America but Japan. However another Portuguese adventurer, Mendez Pinto, who had navigated all the seas discovered by his countryman, was the first European to set foot on the islands of Japan, A. D. 1542.

The reports he gave on his return to Europe sounded so strange that he was called Pinto the Mendacious.

Pinto and the Portuguese.—Pinto and his two companions were armed with arquebuses, which delighted the people. One of them on showing his flint lock to the Governor, and how it could bring down a brace of ducks, was adopted by Tokitaka as his own son, and all had honours heaped upon them. Seventeen years afterwards the whole town was abundantly provided with this arm owing to the dexterity of the Japanese in their manufacture. Hundreds of Portuguese adventurers followed, and were welcomed by the feudal lords on account of the arms and wealth they brought to the aid of their friends.

Most of the Portuguese insurgents found their way to Funai on the East Coast.

Xavier.—The trader was soon followed by the Missionary. A Japanese of Satsuma at Goa became a convert to Christianity, and afterwards Xavier's interpreter. Learning his opinion on the prospects of Christianity in Japan, Francis Xavier set sail, and with two Jesuits and a Japanese landed at Kagoshima, the capital of Satsuma, in 1549.

Early Christianity.—Upon Xavier, as upon every other traveller, the Japanese made a most favorable impression, which he has recorded in his Epistolæ Japonicæ. However, Xavier was soon obliged to leave Satsuma

and betake himself to Hirado, Nagato, and Bango, being everywhere favourably received. In Argo they succeeded in establishing some Christian congregations. In 1550 he set out for Kioto, although the country was full of war and roads unsafe. He was not allowed to speak either to Shogun or Mikado, and the sounds of war prevented his preaching being listened to. He returned to Funai in Bango after a stay of fourteen days, and stayed there for several months. After holding numerous controversies with the Buddhist priests, against whom the Paimio gave his protection, he finally left Japan disheartened for Macao in 1551 and died on the island of Shamkan on the 2nd December 1551.

The seed, however, which he had carried and planted soon bore fruit. He had inspired other Missionaries, whose success was amazingly great. Within five years of Xavier's visiting Kioto seven Christians had sprung up in the capital and numerous Christian communities in the South-West.

Twenty years later the number of Christians in Japan was reckoned at 30,000 ; and in 1581 the Jesuits reckoned nearly 150,000 adherents and over 200 churches. Seven Daimios embraced the new religion, and favored its propagation. In Hondu itself there were several Christian priests.

To revert to the history of the country. After the fusion of the two Courts in Komatsu II, the country had, as we have said, enjoyed a brief period of rest. Pirates by sea and robbers by land had till then rendered life and property unsafe. In the year 1401 the friendliness shown by the Ashikaga Shogun, Yoshimitsu, was interpreted by the Japanese as a needless humiliation to their great neighbour. He further sent presents and accepted in return the title of Nippon O, or King of Japan. This was believed by the Japanese to be done merely in order to exalt the vanity and glory of the usurping Ashikaga, who desired to be called a King but dared not usurp the Imperial throne. Yoshimitsu died in 1393 and fresh disagreements of all kinds rose ; some between the powerful vassals and also in regard to the Imperial succession. The country was devastated for another hundred years. Added to the horrors of the civil war during the first half of the sixteenth century were frequent earthquakes, panics and the devastation of disease. So that in 1545, five years before Xavier visited Kioto, the place was so reduced that no one could live in it, and any one venturing to live among the ruins ran the risk of either being burnt or buried, or at least of dying by starvation. It was at this period that the light of Christianity dawned. By many therefore the latter half of the sixteenth century is looked upon as the most interesting and important epoch of the Japanese middle ages—the age of its first Christianity, of its first persecutions, of its greatest internal changes, and of the greatest development of its power.

Before entering upon it, the fourth period terminates in 1573 with the deposition of Yoshiaki, the fifteenth Ashikaga Shogun.

Nobunaga.—While the country was in this condition, devastated by civil war, Mikado and Shogun with little power, and laws without avail—a state said to baffle description—Ota Nobunaga arose, known as the persecutor of the Buddhists and patron of Christianity. Ota is a village near Fukui in Echizen, and the Ota family which took its name from it was of Taira descent.

Nobunaga distinguished himself in the wars of the times and won for himself a great renown. The Mikado Oki-Machi invited him on this account to undertake the pacification of the country, while at the same time Yoshiaki appealed to him for assistance in securing him the Shogunate. He attempted to comply with both requests, and marching with Yoshiaki the Ashikaga to Kioto he compelled the usurping Shogun to take flight and secured the succession to Yoshiaki in 1568. Yoshiaki however soon after sent on foot a conspiracy against Nobunaga, whereupon the latter deposed him in 1573. Thus ended the Shogunate of the Ashikaga. The dignity of Sei-i-tai Shogun remained vacant till Iyeyasu obtained it for himself and his descendants.

Meanwhile, as we have seen, Christianity had struck root, and it will have been observed that the condition of the country was such as to afford a ready soil for the propagation of its power.

Centuries of misrule had reduced the people, on whom the burden of war fell, to the lowest depths of poverty and misery. Their own religion offered them neither comfort or consolation. Shintoism had sunk to a myth almost unknown to the people, while the Buddhism which overshadowed it had lost its vitality and power. It had degenerated into a commercial system, in which salvation could be purchased only by the merit of the deeds and prayers of the priests. The superstition and impostures of the Bonzes which sought to abuse the credulity of the people and crush their excesses found little sympathy in such spirits as Nobunaga. On the other hand the new reformers introduced with a blameless life and holy earnestness a large heated benevolence for the poverty and miseries of the common people, who saw in the new faith a deliverance for the future, if not a paradise in the present and a home for the aspiration of their hearts. The Jesuit order had been founded in 1542, the year of Pinto's landing.

A further ground for the rapid spread of the new religion lay in the community of rites between the old and new order of things. The adoration of images, incenses and the mass, vestments and rosaries, pictures and altars, beads and indulgences, relics and celibacy, monasteries and convents, processions and pilgrimages, together with priestly hierarchy and much besides were found in common between Buddhism and the new Christianity.

At the same time it must be borne in mind that the primary cause of welcoming the Portuguese was rather the merchandise, of which their firearms formed so important a factor than the Christianty which accompanied and followed them. These however being simultaneously introduced were always associated with each other, so that the fear of the one instilled respect for the other.

FIFTH PERIOD. 1573—1603.

Accession of Nobunaga to Sekigahara, and accession of Iyeyasu.

The Ashikaga Dynasty had ended. Nobunaga's assumption of power gave the country order and security and quietness. Roads were repaired, and attention paid once more to the internal development of the country. In recognition of these deeds the Mikado conferred upon Nobunaga the Taira the title of Udaijin, and he in turn loyally strove to govern the country in the Mikado's name.

He was however thwarted by the rivalries of other families, and by the influence of the Buddhist priesthood.

Finding these the chief obstacle towards crushing the power of his opponents, and that the mountains had practically become fortresses, he took up the sword to destroy them.

In 1571, he had bidden his generals to destroy Hiyesan and its monasteries, notwithstanding the plea of their antiquity and lofty fame. He pointed out the corruption that prevailed in them, and nothing was spared by fire or sword.

In the later siege of the immense fortified monastery near Zoka called Hon-gwangi, some 20,000 of the garrison were either slain or burnt before it was surrendered to the besiegers.

The Buddhists consequently looked upon Nobunaga as a demon and persecutor, and the Bonzes became his declared enemies.

The Jesuits on the other hand (as in their History of the Church) are full of praises for the brave and bold prince, who was a lover of justice and patron of their cause.

He is acknowledged to have had an unbounded ambition, and must be regarded rather as the foe of Buddhist monasticism, whose power he crushed, and protector of Christianity, rather than a friend of the faith to whose spirit he remained a stranger.

Meanwhile Christianity flourished and grew. The Daimios of Bungo, Omura, Arimia, Amakusa, Hirado, and the Goto islands had embraced Christianity. The Daimio of Tosa had become a Christian in 1576 in the teeth of much hostility. In Nagato and Sawo there were many Christians.

In 1582 the Daimos sent a Japanese embassy to kiss the feet of Pope Gergory XIII, and thence on to Lisbon to pay their respects to Philip II. They returned in 1590.

The Jesuits had called the Daimos Kingo, and this great victory over a cultivated heathen people in a distant realm who had been won over to the true fold excited joy, exultation and wonderment in the whole Christian world.

Meanwhile the bright sky had changed in Japan, and signs of storms already appeared in the heaven. Nobunaga had built a splendid temple near Kioto, and caused reverence to be done to it by his son, vassals, and people. His favourite General Hideyoshi required reinforcements against the still powerful Mori. Nobunaga despatched Akechi Mitsuhide, a proud, brave man, who however had taken mortal offence against Nobunaga. Instead of reinforcing Hideyoshi he denounced Nobunaga to

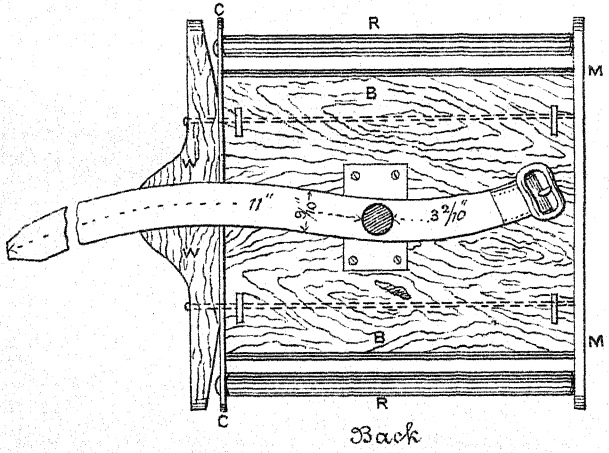
his captains as a mocker of the gods, and promising them rich booty won them over to his treacherous plans. They returned to Kioto and surrounded Nobunaga in his temple. Wounded with an arrow in the shoulder he set fire to the place and was consumed with it, A.D. 1582, aged 39.

On Nobunaga's death the situation was as follows: His third son Nobutaka ruled over Shikoku. Shimadgu was fighting with Oltimi in Kiushiu. His chief general Hideyoshi with Nobuwo, Nobunaga's second son, was fighting with Mori, the prince of Choshin in the west. Iyeyasu, who ruled eight provinces in the Kuanto, was in the field against the Hojo. Shibata, a third general, deepened the river and dug many hundreds of the canals which have caused some to call Osaka, the Venice of Japan. It has now upwards of eleven hundred bridges. He further fortified Fushimi, the military outwork of Kioto. In 1540 he sequestrated Nagasaki from the Daimio of Omura, even then a flourishing port, and made it an imperial town. His rule was highly popular, for he restored peace to the country, re-established law and order and was independent as well as great. In 1586 he received from the Mikado the title of Kuwambuko or Regent. His humble origin and want of a pedigree was the stumbling block to his advancement. He tried in vain to trace his line and continued to maintain a good understanding with Iyeyasu and Mori, the two most powerful vassals of the country, whom he induced to come and do homage to the Mikado. He further cemented his reconciliation with Iyeyasu by offering the latter his sister for his wife. Meanwhile the old Hojo chief Ujimasa of Odiwara, the capital of the eight provinces he governed in the Kuanto, declined to present himself at Court.

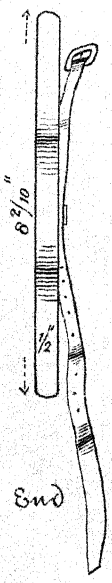
Hideyoshi received permission to fit out a large expedition against Ujimasa, organizing it in three divisions. The expedition was entirely successful. The Hojo castle was captured and Ujimasa himself killed, A.D. 1590.

The
Field Sketching Board.

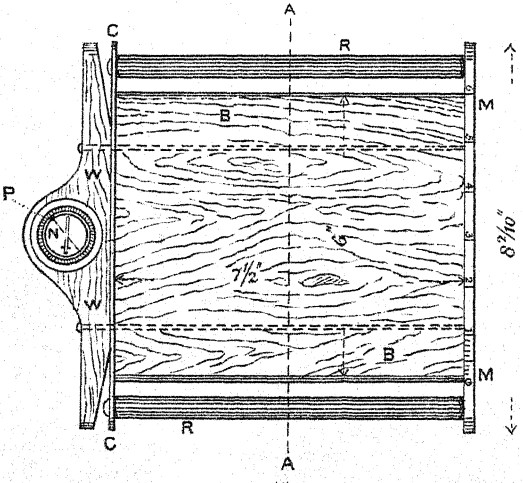
Scale 1/4th full size.



Back



End



Front

WEIGHT. 1lb.

Lithed. by Calcutta Central Press Co. Ltd.

THE "FIELD SKETCHING" BOARD*: HOW TO USE IT.

By Major H. A. Sawyer, B.S.C., A.Q.M.G., I.B.

Description and Make.—The ordinary pattern is made as follows (see diagram): To a $\frac{1}{4}$-inch light wooden board (*B*), seven inches long (measured with the grain) and six inches wide, are fastened at one end a thick strip of gun-metal (*M*) and to the other a thinner piece of copper (*C*), each protruding at either end an inch beyond the board. Near each end are bulged holes as sockets to take the ends of "rollers" (*R*). The copper strip being thin and elastic permits of the rollers being pushed into their proper places, and taken out at will by merely pressing the copper ends outwards.

The friction between these bulged holes or sockets and the ends of the rollers prevent these from unrolling of their own accord.

As a protection to the copper strip, and as a socket for the needle compass (*N*), is further attached a wooden piece (*W*). These three pieces, *M*, *C* and *W*, are bolted together by bolts that run through the board (*B*) (shown in dotted lines). In the centre of the board at the back is a leather strap which can revolve round a flat copper nail head. The sketching board weighs one pound. It is strongly built, and can stand a good deal of knocking about.

Recently a lighter kind has been made with no metal about it except the spring copper strip. The compass is smaller and the whole affair less than half a pound in weight. It is quite strong enough, and the difference in weight is of much more importance than generally supposed. I would strongly recommend the more modern and lighter kind for ordinary use; moreover it is half the price of the former. These are now made in Calcutta in the Mathematical Instrument Department.

To each case is generally added a flat ruler, 10″ long, 1″ wide, as also two broad India-rubber bands.

The compass is fixed and lies flush with the surface of the board. It has a glass cover that can be made to revolve horizontally by pushing a small metal point (*P*), from which point is struck a clearly-marked diameter cut in the glass. Thus *P* and the glass and the diameter revolve together. This diameter I shall call the "glass meridian." As the case is generally held in such a manner that the compass is to the left I shall further call *R* the upper roller and *R* the lower roller. The imaginary line passing through the centre of the two rollers I shall also call the "axis" (*A A*).

To prepare it for use.—Drawing paper must be cut into strips just a little less wide than the clear length of the rollers. These are

* Known also as the "Cavalry Sketching Case."

generally split in two pieces, the angle of the cross section of one being about 270° and of the other 90°. One end of the strip of paper must now be turned down about half an inch on to that side of the paper on which it is intended to draw; place the smaller piece of the roller into this "turn down," and place these, *viz.*, paper and the small piece of the roller, into the bigger piece. Hold all this tight together, place the back of the paper on to the board, and then the roller into its inelastic socket; lastly, the other end into the copper spring socket. Take a sharp knife and cut off any pieces of paper where they protrude from the roller's slit. Now roll up tight the whole strip of paper. The paper must move from the upper surface of the board to underneath the roller; this protects the drawing from being smudged. An elastic band placed over the paper and board at *D* will prevent the paper from unrolling. Treat the other end of the paper in the same way. Give it two or three turns, and affix the other rubber band at *E*. The bulk of the paper must be on the "upper" roller to start with. The board is now ready to be "set."

"*How to Set.*"—"Setting" the board is merely for the purpose of keeping the work as much as possible in the centre of the paper (*viz.*, near the axis). This is made much of by instructors, and is a source of anxiety to the beginner. At an examination I have seen an unfortunate rub out 3 miles of work and ride back to start afresh because he ran off the paper! As will be shown later on, a bad "set" can be remedied without rubbing out a stroke. It looks well no doubt to have a 9-mile sketch on 6″ to a mile in the centre of a strip of paper; it is perhaps a sign of a good set (if the road is not very tortuous), but it is of little moment in practice. To lay stress on it is mere pedantry.

(*a*) *To "set" without a Map.*—If standing on an elevation and you can see for some way the general alignment which the work (a road) will take, place the "axis" in the alignment (compass to the left), and when the needle is steady slightly tilt the board (to fix the needle); then, by turning the point *P*, make the "glass meridian" coincide with the needle. On a scale of one mile to an inch such a "glass meridian" will hold good for any turns of the road reaching 3 miles to the right and 3 miles to the left of its general direction.

(*b*) *To "set" with a Map.*—If a small scale map is given, and on it are given two points, say *X* and *Y*, ten miles apart, the road joining which is to be sketched, place the board with its "axis" on the alignment *X Y* on the map. On the map draw a magnetic meridian, allowing for the correct variation for the year and place. Now make your glass meridian coincide (parallel) with this magnetic meridian, and the board is "set."

"*What Material to use.*"—Any smooth-surfaced tough paper is the best. It takes less dirt, smudges less, and is best for after treatment. Cartridge paper is excellent. Its yellowish surface is not so trying to the eyes as pure white paper. For much out-door work I always prepare my "rolls" (strips cut to the width of my board kept, rolled up ready for use) by dipping them into a light solution of indigo. Bankpost rolls should always be at hand. They are most useful when only ferrotype

reproduction can be counted on. When using Bankpost paper cover the surface of the board (underneath the roll) with a piece of white paper. Never use ruled paper. In theory it is splendid, in practice for this work an abomination; pencil, pen and ink are the only legitimate materials for drawing with for military purposes in the field. Rubber elastic bands, broad and large, should be kept in stock (on person); on the edges of the ruler you can have scales of walks, trots, canters, time, yards. The ruler is sometimes convenient, but more often not. I have discarded it altogether for a piece of cardboard, about 2 inches long, one inch wide, properly scaled and varnished over. Tied by a strong thread (half a yard long) to the right-hand upper corner of the board, when not in use shoved under the top elastic band, it can never get lost, and is always handy. Practice soon allows of the longest "shoots" being made perfectly straight freehand.

Robertson's Liquid Indian Ink is first class. I have a little left in a bottle I first opened in 1883. It is still in perfect order. The Baboo's ordinary pointed steel pen is best of all.

"*How to carry it.*"—When at work the board is meant to be strapped round the wrist or forearm, but my advise is try first any other way but that, for it is a most uncomfortable, trying and unsteady method. I always hold mine between thumb and forefinger of left hand, but keep the strap (unbuckled) firmly in the hand at the same time to steady it. When not at work the board should have a leather case and strap to pass over the shoulder, but the strap should be then shortened so as to bring the case close under the armpit. Some strap the board when done with round the upper arm, but I don't trust any leather in this country. I prefer a havresack to anything else. Mine holds board, pencils, ink, pens, rubber bands, foolscap (2 quires), rolls, sufficient for 1,000 miles of road (on one inch).

Measurement used.

(*a*) *Linear.*—Counting the horse's paces or taking his rate of progress by time are the only methods used for measuring distances when using this sketching board. The most accurate of these is, of course, counting the horse's "walk." Which to use, is regulated by the rule "Be as accurate as time permits." If you are marching with troops, for instance by ordinary marches, you know you have 6 or 7 hours to do the 10 or 12 miles in. Make "walks" your scale for the forward alignment, trots and canters for offsets. Always have an orderly (mounted if possible) on the spot you set off from. Some allow the counting to be done by others. This, however, always turns out unsatisfactory. Counting a horse's "walks" is as accurate as pacing on foot if proper allowances are made. Every horse has his own "allowance." For an English horse I had I was obliged to allow (possibly owing to this country), even when in good condition, at a "walks" one per cent. per hour, that is, after five hours on the road he stepped five per cent short; with quick "walk and trot" work double that amount. A Yarkandi I have requires no allowance, even after carrying me the whole day. Allowances must also be made for the nature of the soil, slope of track,

&c. In pebbly river bed (like North-western Frontier) horses walk tenderly and short; ditto on sloping ground. Some horses step out ten per cent. at once when joined by another horse on the road and lag again when alone. With rifle ranges, mile stones, railway and telegraph lines, near every cantonment, there is no excuse for an officer not knowing his horse's paces and "allowances" at all times of the year. Hurried "galops over" can, of course, only be done by time. It is not generally credited how accurate this, too, can be made. In "general reconnaissances" extending over many hundreds of miles, even when the dead reckoning is unchecked by astronomical observation, the error need be only very small. In such a recent tour the dead reckoning (unchecked) of an Intelligence Branch Officer's (Bell) work was found to be only 10 miles out after a run of 600 miles.

The Germans in their regulations lay very little stress on accuracy, and the latest on the subject (May, 1887) only require a freehand sketch (plan) not drawn to scale.

Our conditions, however, are different, for wherever the German fights he does so with a perfect ordnance map of the theatre of war in his hand. We work generally in the wildest and most desolate parts of the world, hence the requirement in our army that every officer should be able to do something in the field sketching line.

Between the accurate "walk" sketch and the freehand sketch plan of the reconnoitring officer made at a galop pursued by enemy's scouts there are many phases of accuracy. The phase to go in for must be left to the gumption of the individual, but always enter on your sketch the reliance that should be placed on the measurements given.

This is most important because, if a good draftsman and you submit a pretty sketch, you will *primâ facie* carry more weight than a less talented draftsman, who having had more leisure had the means of making really more accurate measurements, lineal and angular.

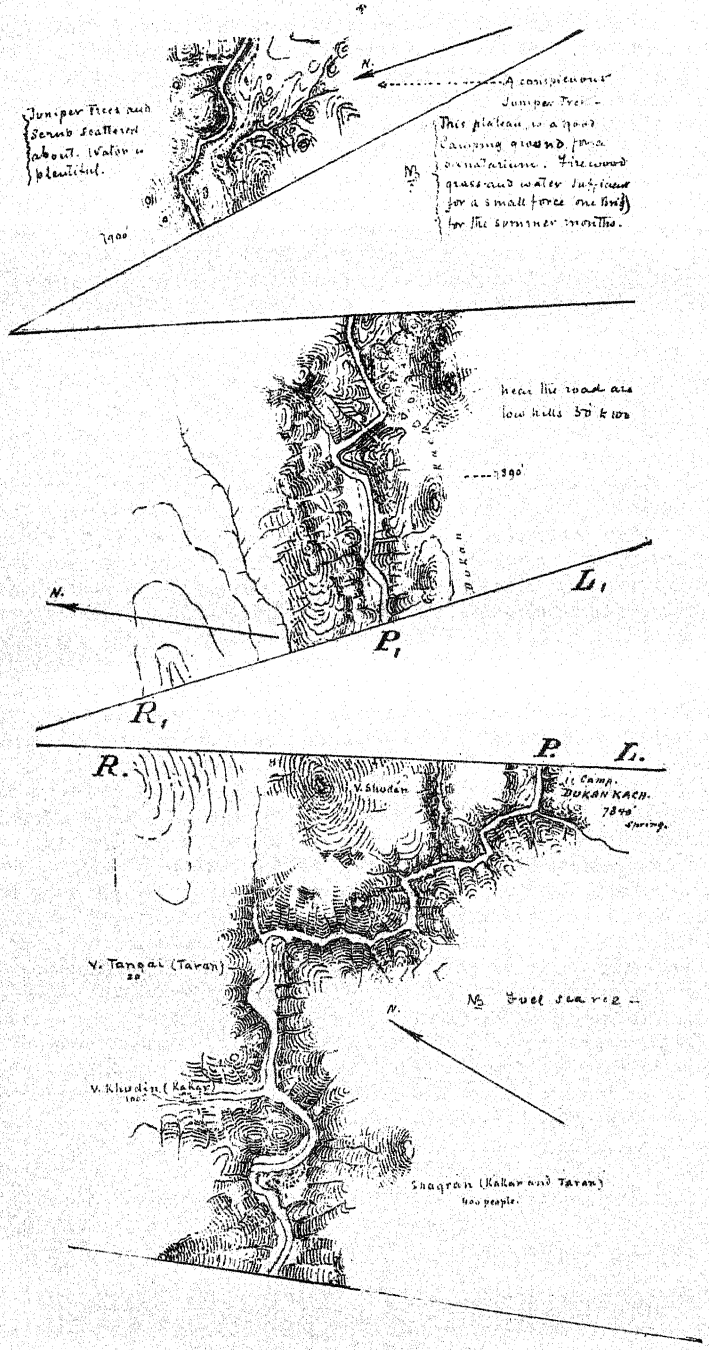
It is wonderful how "eye wash" goes down with the uninitiated.

(*b*) *Measurements, Angular.*—The beginner is taught to lay the ruler on the new alignment; keeping his eye on the needle and "glass meridians" to see that these coincide; then to draw his pencil along the ruler. A little practice will show him that he can dispense with the ruler and then he can draw a straight line towards the distant object freehand.

A very fair triangulation can also be made with the sketching board, quite as accurate as any work with a prismatic compass. Try it two or three times on foot, making a circuit from $\frac{1}{4}$ mile to 6 miles or more, and after a while you will find that you will close on your starting point in a remarkable manner.

Work in General, Style, &c.—Complete your sketch as you go along in pencil; do not trust to filling in details afterwards. Make full notes on margins in a neat and finished style. Be sparing with your India-rubber. If you have time to make a full and detailed sketch of a road, the regulation additional written report, beyond a few general "summing-up" observations, is quite unnecessary. The sketch should show everything of military value, and omit everything of no military value. At any time in one's work one may meet with an accident.

II


Juniper Trees and Scrub scattered about. Water in plentiful.
N.
A conspicuous Juniper Tree
This plateau is a good Camping ground free from mosquitoes. Fire wood grass and water sufficient for a small force one week for the summer months.
No 7
7900
near the road are low hills 50' & 100
7390'
DUKAN
L1
P1
R1
R.
P.
L.
V. Shodan
Camp. DUKAN KACH. 7840' Spring.
V. Tangai (Taran) 20
No fuel scarce
N.
V. Khudjin (Kakar) 100
Shagrai (Kakar and Taran) 600 people.

The sketch should therefore at all times be in such a guise that it can be taken up and finished by another at a moment's notice.

Hills should always be hâchured in on the spot. That mezzo-tinting business is all very well for "schools of instruction and garrison classes," where generally nice pieces of ground are selected and drawn on scales large enough to show an ordinary-sized flower-pot. The field sketching board implies real business free from examination "eyewash." All coloring and mere prettiness should be rigorously tabooed. But withal neatness and good draftsmanship are essential. It is a mistake to think that hâchuring takes time. On the scale used in the field a few strokes of hâchuring can be put in rapidly on the spot, showing the character of the hills and undulations at a glance. The one-inch, half-inch and quarter-inch* scales should always be practised. I give a specimen of a half-inch scale in diagram (II). This is a reduction by photo-zincography of a portion of a one-inch reconnaissance, but it will be seen that there ought to be no difficulty in drawing it at once on the half-inch scale.

As already remarked beginners show much anxiety about a good "set" and about keeping their sketch in the centre of the paper. For an "eyewash" sketch I admit it pays better, but for practical work I think that to hug one side of the paper without detriment to all the ground one is able to bring in, has the advantage of giving more room for written remarks, or making freehand illustrations. Drawings made without this "field board" are often most inconveniently large sheets of paper, with additional pieces gummed on wherever the road "runs off" the last piece. Such work is a nuisance to everybody, besides being impracticable in the field. The field board saves us from all this, and any road, however tortuous, however long, can be brought on a strip from two inches to six inches wide, according to the scale used.

Whenever the drawing approaches the margin of the paper so close that you are not able to show all you want to, merely draw a line (*L R* in diagram II) at right angles to the alignment on which you are at the moment standing, and draw in every detail neatly up to that line on both sides of the road. Then from that point (*P*) "re set" your board for the same or a new alignment, bringing it (that point P) as a fresh starting point into the centre of the board, as if starting *ab ovo*. Through this new point (*L*) draw another line (*R L*) at right angles to the new alignment. These will be "joining lines." Whenever a new "set" is made don't forget to enter close to these joining lines the "old" and the "new" north points." The angle formed between these two "north points" and the "joining lines" must be the same. When it is required to show the road unbroken, the blank spaces between the "joining lines" have only to be cut out, and it will be found that the "north points" will all be parallel.

Should the reset have to be made where the ground is intricate (and this is, of course, often the case) it may be convenient to put in the

* *Viz.*, one mile, two miles and four miles to an inch.

ground, in duplicate, beyond each joining line. In this way, by continually resetting, a sketch can be continued *ad infinitum* without inconvenience on a very narrow strip of paper, which is handy and compact.

To finish.—When at leisure, every evening, if the work extends over several days, I at once ink over the pencil drawing and marginal notes of that day. Anybody can do that for one if the above rule of *finishing* in pencil as one goes along is carried out; still it is more satisfactory to "ink over" oneself and at once. An hour suffices for the heaviest day's field work. Colors should never be used if there is any chance of the sketch being required for reproduction.

Before inking in roll all the papers on to the upper roller, leaving the commencement of the pencil work in centre of board. Now begin to ink in. Go carefully over every pencil stroke and resist imagination. If it makes it clearer add to the remarks in the margin. Every six inches or so draw (freehand) a line showing divisions of 100 yards or 1,000 yards; miles or their approximations should always be entered on the road itself. As often as possible put in the aneroid altitudes. Don't disfigure your sketch with imaginary tape-worm-like contours, for they are worse than useless. To show the wave of ground use horizontal hâchuring; for rocky precipitous ground vertical hâchuring; for anything between the two use both methods. Show by your work the character of the ground. On every elevation give an estimate of its height over the road track where nearest to it. Make symbolic distinctions between your *estimates* and *aneroid readings;* never omit the "glass meridians or north points" near every "joining line." Enter your name in full and state the time you had at your disposal, or the rate at which you worked, and on mature reflection your opinion of the value of your measurements, for you might have had a strange horse, or a bad compass, or a worthless aneroid, or what is far worse you might have been "put out" before or during the work!

Conclusion—The sketch is now ready for submission. The "report" ought to be exceedingly short; in fact I cannot conceive the use of one at all if a walk reconnaissance has been made. Of course the less ample the sketch the more essential the report; but never repeat in your report what you have already shown in your sketch. A report for "route compilation" is another matter, and has nothing to do with a "sketch report."

With a little practice the "Field Sketching Board" can be a handy and valuable instrument in most officers' hands. It is now cheap, and can be obtained in India or made up in any regimental workshop. It can, moreover, be improvised without difficulty. An ordinary one-inch compass, which can be bought for a rupee, fixed firmly into the side of a thick piece of mill board, 8″ × 10″, with two elastic bands, will answer almost as well. A bazar mistri can easily put in a revolving "glass meridian." Wilkinson's patent (A. & N. Coop. Stores, price about 10 shillings) is a capital little compass; it is made for this very purpose; of being easily fastened to a thin wooden or mill board.

The principles of surveying taught at our schools of instruction are equally applicable to reconnoitring with the field sketching board, so nothing

need be said about that here. All I would point out is that, though with the above hints and his previous garrison course training any fair draftsman can learn how to use it by himself, some practice will be required before he can work rapidly. It is hard bodily work, and has the advantage over some other bodily exercises of being intelligent work as well.

CORRIGENDA.

VOL. XV. No. 69.

THE FIELD SKETCHING BOARD AND HOW TO USE IT. BY MAJOR A. H. SAWYER A.Q.M. G.I.B.

Owing to my absence from India the final proofs were not checked. At Page 443 lines 3 and 5 from the bottom, the second letters should have a dash as also the lower letters in the sketch. At Page 444 lines 12 to 15, D and E should have been shewn in the sketch respectively an inch (to scale) below and above the upper and lower rollers.—Page 445, line 15 read Roberson for Robertson. Page 447 line 10 from bottom read obviously (P,) and (R, L,)——instead of (L) and (R L)

KENDAT:
6th February, 1888.

H. A. S.

REVIEW.

TEXT BOOK ON GUNNERY, 1887.

By MAJOR J. MACKINLAY, R.A.,
Instructor in Artillery, Royal Military Academy, Woolwich.

This work consists of two parts, the headings of the chapters being as under :—

PART I.

Chapter I.—Definitions and Units.
" II.—Internal Ballistics.
" III.—General comparison of Guns.
" IV.—Steel for Ordnance.
" V.—Principles of Gun Construction.
" VI.—Details of Gun Construction.
" VII.—Laying.
" VIII.—Stresses on Gun Carriages and Recoil.
" IX.—Atmospheric effects on firing Guns.
" X.—Muzzle Velocity.
" XI.—Twist of rifling and Drift.
" XII.—The Resistance of the Air.
" XIII.—Trajectories.
" XIV.—Accuracy of Fire.
" XV.—Range Tables.
" XVI.—Armour.
" XVII.—Penetration of Armour.
" XVIII.—The penetration of Earth and Masonry.

PART II.

Chapter I.—Gunnery Instruments.
" II.—The strength of Guns.
" III.—Bashforth's Tables and Coefficient K.
" IV.—Trajectories at any angle of elevation.
Gunnery Tables—Tables I to XIX.

The above table of contents will give an idea of the very complete character of this work, embracing every branch of scientific and practical gunnery.

PART I.

CHAPTER II.—This chapter contains accounts of experiments for determining the pressure and temperature of fired gunpowder, chiefly carried out by Captain Noble and Sir F. Abel, names well known to every gunner for their scientific researches in gunnery. The questions of "expansion in the bore" and "gravimetric density" are here treated of, and several examples are worked out.

CHAPTER III—After discussing the general comparison of guns gives a summary of the progress of late years :—

S. B. Guns—Were made of good materials, with great care, and subjected to rigorous proof.

R. B. L. Guns (screw).—Increase of manufacturing skill and knowledge of metallurgy introduced these guns, with moderate velocities but great advantages in range, accuracy and increased shell power.

Muzzle Loaders and Heavy Guns.—It being considered that the R. B. L. system had many objections and was unsuited to heavy guns * M. L. guns were adopted with hardly any increased velocity, and attention was given to attaining power by making very heavy guns.

Greater energy without increasing calibre.—It became gradually recognised that the velocities of the projectiles must be increased; this was done by improving the strength of guns, by higher charges as in the 16-pr., and by larger bores as in the 9-pr. of 6 cwt.

High velocities.—Latterly great attention has been paid to the quality of the powder. By air-spacing and chambering very large charges can now be burnt, whilst a well-sustained pressure is maintained on the projectile, and it leaves the bore with a high velocity, ranging far and accurately.

CHAPTER IV—Deals with the produce of iron and steel of different countries, the properties of steel and the various methods of its manufacture. Its various uses for military purposes, such as ordnance, gun carriages, projectiles, armour and ships, is then discussed.

CHAPTER V—Treats of the principles of gun construction under the various headings of "Initial Stresses," "Shrinkage," "Wire Guns," "Cast Guns," Longitudinal Strength. It considers chiefly the general nature of the stresses and strains to which a gun is subjected on firing and the means taken to meet them.

CHAPTER VI—Deals with the details of gun construction, and discusses the questions of breech and muzzle-loading guns, grooves, twist, vent, chamber, grip, choke and stop, bore, liners, gas-escape, breech fermeture, obturation, trunnions and ordnance in parts.

CHAPTER VII.—This is an excellent chapter of a very practical character, and should be studied by all gunners, for it should never be lost sight of that the object to be attained by all artillery is accuracy of fire, and that unless this desideratum *is* attained the finest battery in the service is practically useless. This is a point which I regret to say is not sufficiently kept in view in our service, and demands the earnest attention of all concerned. The real merits of a battery are apt to be lost sight of in a search for what may be termed eyewash; inspecting officers rarely trouble themselves about the shooting powers of a battery.

As Prince Hohenlohe says in his letters, "artillery must in the first place *hit*, in the second place *hit* and in the third place *hit*.

CHAPTER VIII—Deals with the stresses produced by discharge and which are expended destructively on the gun carriage and in producing recoil. These are:—

(I) In a vertical plane through the axis of the gun.

Note by reviewer: To this utterly false idea, which was prematurely come to away to the complicated nature of the Armstrong gun, we are indebted for having had only M. L. guns whilst other countries have had B. L. guns, and we have consequently been for a long time years behind the age.

(II) In a vertical one at right angles to the first.
(III) In a horizontal plane.

It further explains the various methods of checking recoil, such as—

(I) Moncrieff's system of disappearing carriages.
(II) Check ropes in mountain guns.
(III) Hydraulic buffers.
(IV) Hydro-pneumatic carriages.

CHAPTER X—Explains the method of ascertaining the muzzle velocity of guns, upon which their effective action so largely depends. Bashforth's and Boulengé's chronographs are the best known instruments, with which all gunners are more or less familiar.

CHAPTERS XI, XII & XIII—Deal with "twist of rifling and drift" and "the resistance of the air" and trajectories, and do not contain much that is very new.

CHAPTER XIV.—This chapter cannot fail to convey instruction of a useful character to all who study it.

It first treats of the *causes of inaccuracy, viz.* :—

1.—Want of accuracy in the gun and variation in the mounting.
2.—Want of uniformity in the ammunition.
3.—Errors in laying.
4.—External causes, such as wind, &c.

It then deals with the question of ascertaining the "range and accuracy" of guns on their introduction into the service and the subjects of—

(I) Probable zones,
(II) Employment of probability table, with numerous examples,
(III) Small arms,
(IV) Accuracy on service,
(V) Range finders,
(VI) Ricochet fire,
(VII) Shells bursting on graze,
(VIII) Accuracy of shrapel shell fire—

are all discussed at some length.

CHAPTER XVI.—Is a very interesting one on armour and its uses for military purposes, such as land defences, armoured trains and ships of war.

CHAPTER XVII.—This chapter, with the present extensive use of armour, both for naval and military purposes, conveys valuable information regarding the results of, and conclusion arrived at on, the latest experiments in the penetration of armour plates ; it further gives examples of the theoretical calculation of penetration of armour plates, the formulæ for which are more or less empirical.

CHAPTER XVIII—Contains much useful information on the penetration of earth and masonry, dealt with under the headings of—

Breaching hidden scarps,
Curved fire from guns.
Penetration in various substances.
Breaching visible earthworks.

Silencing the fire of guns.
High angle fire.
Steel common shell and shrapnel shell fire.

PART II—Deals entirely with the scientific and mathematical side of gunnery; its mysteries are beyond the pen of the writer of these lines. No book on gunnery would be complete without these four chapters; but they are for the few, and not for the rank and file of, artillery readers.

Major Mackinlay's work is most carefully prepared, and deals with scientific and practical gunnery in all its phases. A perusal of the work cannot but leave the reader a wiser and sadder man, wiser by the knowledge he has acquired and sadder at the sense of his own previous ignorance of the subjects treated on.

E. R. E.